



Department of  
Agriculture and Food



Bulletin 4857  
February 2014  
ISSN No. 183 7366



# 2014

## Wheat Variety Guide for WA

Supporting your success



# Wheat variety guide for WA 2014

*By Brenda Shackley, Christine Zaicou-Kunesch, Harmohinder Dhammu, Manisha Shankar, Mohammad Amjad and Kevin Young.*

*Department of Agriculture and Food, Western Australia*

## Acknowledgements

The information contained in this Bulletin is based on the work conducted by many research scientists, extension officers and plant breeders. The authors would like to thank the following groups of people from the Department of Agriculture and Food, Western Australia:

Sandra Prosser provided valuable assistance with the huge task of editing and proof reading. Also to Jackie Bucat for the final edit.

Wheat Agronomy project team: Paul Bartlett, Rod Bowey, Ben Curtis, Mario D'Antuono, Bruce Haig, Chad Reynolds and Anne Smith.

Plant Pathology: Donna Foster, Hossein Golzar, Dorthe Jorgensen, John Majewski, Geoff Thomas and Sarah Collins.

Herbicide tolerance work: Dave Nicholson and Vince Lambert.

Cereal Chemistry: Troy Adriansz.

Research support units: Esperance, Geraldton, Katanning, Northam, Merredin and Wongan Hills.

Additional data supplied by Daryl Mares (University of Adelaide) and Hugh Wallwork (SARDI).

Thank you to National Variety Trials (NVT) and breeding organisations for their cooperation in providing data.

This publication and the Wheat Agronomy project are funded by GRDC and DAFWA.

## Disclaimer

The Chief Executive Officer of the Department of Agriculture and Food and the State of Western Australia accept no liability whatsoever by reason of negligence or otherwise from use or release of this information or any part of it.

Copyright © Western Australia Agriculture Authority, 2014

Copies of this document are available in alternative formats upon request.

3 Baron Hay Court  
South Perth WA 6151  
+61 (0)8 9368 3333  
enquiries@agric.wa.gov.au  
agric.wa.gov.au

## Abbreviations

<sup>Ⓟ</sup>: denotes that the variety is protected by Plant Breeders Rights. Not all varieties protected by PBR have a restriction on grower to grower trading; these are denoted as free to trade and can be traded between farmers.

**AH:** Australian Hard, **APW:** Australian Premium White, **ASW:** Australian Standard White, **ASWN:** Australian Standard White Noodle, **ASFT:** Australian Soft, **APW – imi:** Australian Premium White – imidazolinone tolerant wheat, **TBC:** To be classified.

# Contents

<b>Introduction</b> .....	2
<b>Variety and agronomy for 2014</b> .....	2
Disease – new leaf rust strain in WA .....	2
Disease – others .....	2
Varieties .....	2
Seasonal conditions .....	3
Seed quality .....	3
Storage conditions and duration .....	3
<b>Agzone performance</b> .....	4
<b>Long term wheat yields</b> .....	4
<b>Predicted yields of varieties in NVT trials from 2009 to 2013, expressed as a percentage of Mace<sup>®</sup> (Table 1)</b> .....	5
<b>Wheat variety summary for Western Australia, grouped according to grade (Table 2)</b> .....	6
<b>Disease resistance ratings, quality and agronomic traits for wheat varieties grown in WA in 2013 (Table 3)</b> .....	8
<b>2013 Northern Agricultural Region (NAR) Summary</b> .....	10
<b>2013 Central Agricultural Region (CAR) Summary</b> .....	14
<b>2013 Great Southern and Lakes Region Summary</b> .....	18
<b>2013 South Coastal Agricultural (SCR) Region Summary</b> .....	22
<b>Date of flowering (50%) for 22 wheat varieties from different sowing dates at four locations in WA in 2013 (Table 14)</b> .....	24
<b>Herbicide tolerance of wheat varieties</b> .....	25
<b>Percentage of area sown to wheat varieties for the 2008/2009 to 2013/2014 seasons. (Table 17)</b> .....	31
<b>Marketers</b> .....	31
<b>Seed distributors</b> .....	31



## Introduction

The wheat variety guide summarises performance characteristics of commercially available wheats which have undergone testing in the National Variety Trials Project (NVT), and Department of Agriculture and Food (DAFWA) wheat agronomy project. This information includes variety summaries, agronomic, disease and herbicide tolerance characteristics and medium to long-term yield performance. There is a review of regional NVT performance, time of sowing experiments and observed flowering dates in 2013. By combining agronomy research outcomes with other related wheat research this document provides current information to assist with variety choice and management for 2014. For more information on wheat varieties visit [www.nvtonline.com.au](http://www.nvtonline.com.au).

## Variety and agronomy for 2014

### Disease – new leaf rust strain in WA

Unusually high levels of wheat leaf rust on various resistant varieties, including Wyalkatchem<sup>®</sup>, were observed in September and October of 2013. These reports came in from diverse regions including Northampton, Borden, Esperance and the Great Southern Region from Brookton to Hyden. Samples were sent to the Australian Cereal Rust Control Program's (ACRCP) laboratories at the University of Sydney and a new leaf rust pathotype (strain) was identified. This pathotype (76-1,3,5,7,9,10,12 +Lr37) represents the first occurrence of virulence for the resistance genes *Lr13*, *Lr17a*, *Lr17b*, and *Lr26* in WA.

It is speculated that this new pathotype of leaf rust moved to WA from eastern Australia last year on prevailing wind currents. This is a rare occurrence and only the second report of east to west movement of rust since 1990. The movement of rust from WA to eastern Australia via prevailing winds is more common. It is also possible that the new pathotype could have entered WA on someones' clothing.

**Implications:** Varieties which carry the *Lr13* gene (such as Wyalkatchem<sup>®</sup>, Corack<sup>®</sup> and Emu Rock<sup>®</sup>) and the *Lr17a* gene (Fortune<sup>®</sup>) are less resistant to the new leaf rust pathotype and will require additional management. Wyalkatchem<sup>®</sup> and Corack<sup>®</sup> ratings have changed from RMR to MS and Emu Rock<sup>®</sup> from R to MSS. Some varieties have other leaf rust genes that are expected to still be effective and will therefore have a lesser rating shift (King Rock<sup>®</sup>, Fortune<sup>®</sup> and Zippy<sup>®</sup>). The impact of the new pathotype on Mace<sup>®</sup> is not apparent as yet. It has a gene combination including *Lr13* that gives it its current MR status and tests are still continuing to fully understand its response to the new pathotype. In areas that are prone to leaf rust growers should be prepared for the chance that Mace<sup>®</sup> may respond as an MRMS or at worst as an MS in 2014.

Likewise, further tests are needed to establish responses of Carnamah<sup>®</sup> and Cobra<sup>®</sup> which may also be vulnerable to the new pathotype.

### Management strategies for the new rust strain:

- destroy any volunteer wheat regrowth in leaf rust prone areas, including those where leaf rust was found in 2013
- closely monitor crops and to ensure early identification, should rust be found, let other growers know through such means as Pestfax
- have a fungicide control plan

### Disease – others

Yellow spot and septoria nodorum blotch (including the widespread occurrence of glume blotch) were prevalent last year. Stubble from infected paddocks will be a source of inoculum for this season, particularly in continuous wheat. Disease incidence in the 2014 season will be dependent on the favourability of seasonal conditions and amount of inoculum carried over. If these diseases are present, and moving up the canopy, good results can be obtained with a single application of a registered foliar fungicide at or around flag leaf emergence to protect the upper leaves that contribute most to yield. In wheat on wheat situations, when early disease is severe, consider applying a foliar fungicide during tillering, around first node stage. A follow-up application around flag leaf emergence may also be required. Economic returns are most likely in environments where rainfall promoting disease development occurs in the weeks after fungicide application.

Two disorders which can be misdiagnosed as diseases were apparent in 2013. In Mace<sup>®</sup>, leaf yellowing can be mistaken for yellow spot. False black chaff can be mistaken for glume blotch in several varieties. These are not diseases and their occurrence is dependent on variety genetics and environmental conditions rather than inoculum carry-over. Because both disorders can be confused with diseases, it is important to pay particular attention to correctly identifying the cause of symptoms before using fungicides.

Table 3 provides the current disease resistance ratings for wheat varieties grown in WA. Additional information on diseases and disease management can be obtained on [www.agric.wa.gov.au/cropdisease](http://www.agric.wa.gov.au/cropdisease).

### Varieties

Before adopting a new variety it is important to consider why you want to replace existing varieties, and if the new variety will meet your needs.

Two new wheat varieties were released in 2013 for WA.

**Harper<sup>®</sup>** and **Trojan<sup>®</sup>** are both mid to long season varieties with the potential to replace Yitpi<sup>®</sup>. Harper<sup>®</sup> is an APW, while Trojan<sup>®</sup> is yet to be classified for WA. In 2013, Trojan<sup>®</sup> was the higher yielding of the two especially when yields exceeded 3t/ha. Refer to the regional summaries for additional information.

The area sown to Mace<sup>®</sup> has increased to over 50% of the WA wheat crop in 2013 (Table 17). This rapid adoption of Mace<sup>®</sup> is supported by the fact that the variety has been shown to consistently produce high yields compared to other varieties in the NVT trials over the last five seasons. Mace<sup>®</sup> also provides good disease resistance, grain quality and better tolerance to sprouting compared with other main competitors such as Wyalkatchem<sup>®</sup> and Magenta<sup>®</sup>.

There are other alternative varieties released in the last five years that have shown specific areas of adaptation to warrant them being considered to either complement or provide viable alternatives to Mace<sup>®</sup>. The varieties and their likely roles that match their strengths are:

- Magenta<sup>®</sup> (APW) a mid-long maturing variety which is best suited to early sowing and where there is a high probability of yellow spot.
- Emu Rock<sup>®</sup> (AH) is an early maturing variety that is the most competitive with Mace<sup>®</sup> at yields up to 2t/ha and so may have an important role in the lower rainfall regions.
- Corack<sup>®</sup> (APW) is competitive where it is likely that protein is restricted to APW grade and yellow spot is prevalent. Variable falling number and susceptibility to powdery mildew and black point make Corack<sup>®</sup> unsuitable for the higher rainfall coastal regions.
- Cobra<sup>®</sup> (AH) yields best relative to Mace<sup>®</sup> in very high yielding scenarios and has also displayed better tolerance of yellow spot. Cobra<sup>®</sup> has out-yielded Mace<sup>®</sup> on low pH soils where yields are above 2.5t/ha.
- Estoc<sup>®</sup> (APW) is a later maturing Spear type wheat that is a rust resistant alternative to Yitpi<sup>®</sup> with a possible yield advantage, particularly in Agzones 5 and 6.
- Scout<sup>®</sup> (APW) and Envoy<sup>®</sup> (APW) are earlier maturing Spear type wheats that are more competitive with Mace<sup>®</sup> in the south where yellow spot is less prevalent and sprouting tolerance is important.
- Justica CL Plus<sup>®</sup> (APW) and Grenade CL Plus<sup>®</sup> (APW) are imidazolinone tolerant wheats. Options for weed control puts them in a class of their own. Justica<sup>®</sup> is better suited to the medium to high rainfall regions.

As potential Yitpi<sup>®</sup> replacements, there is interest in the flowering dates of Harper<sup>®</sup> and Trojan<sup>®</sup>. These have been tested across a range of sowing dates in 2012 and 2013 (Table 14) in trials ranging from Geraldton to Esperance. In both years Harper<sup>®</sup> was slightly earlier maturing than Yitpi<sup>®</sup>. Trojan<sup>®</sup> showed a marked difference between the two years. In 2012 it was similar to Harper<sup>®</sup> (a few days earlier than Yitpi<sup>®</sup>), however in the cooler, wetter year of 2013 it flowered earlier and was midway between Mace<sup>®</sup> and Yitpi<sup>®</sup>.

Refer to regional summaries for additional comments on varieties. More detailed information can also be found from the 2014 Crop Updates (C. Zaicou-Kunesch: Choosing the right wheat variety for the system).

## Seasonal conditions

Be prepared for the season ahead. Conserving stored moisture through summer weed control can give greater certainty going into the cropping year and earlier sowing opportunities. Crop inputs should be used tactically where possible to avoid too many upfront costs which can increase losses if the season doesn't finish strongly.

## Seed quality

Seasonal conditions can have a significant and variable impact on the next year's germination, early vigour and crop stand. Routine germination testing before seeding is recommended. Grain with lower germination produces seedlings with slower and more variable emergence. Replacing seed with less than 90% germination is recommended. Slight losses in germination can be compensated for by increasing seeding rates.

In general screenings were not an issue in 2013 but it is important to realise that although grain size has little or no effect on germination, small seeds result in seedlings that are less vigorous than those from large seed. Viable frosted grains should not be used as seed as they produce seedlings that take longer to reach the same seedling dry weight than seedlings from sound grain.

Grain weight can vary from season to season but note that the new varieties Corack<sup>®</sup> and Emu Rock<sup>®</sup>, can have a larger seed size which can have an impact on reducing the number of plants established. Refer to individual trial summaries for the range of grain weights ([www.nvtonline.com.au](http://www.nvtonline.com.au)).

Minimise the impact of sub-optimal seed quality by adhering to the following guidelines:

- Grade seed to eliminate small seeds which are less vigorous but ensure seed handling is kept to a minimum.
- Avoid sowing too deep and where practical sow into warm moist conditions.
- Do not keep weather damaged seed for more than one season.
- Use fungicide seed dressings and pre-emergent herbicides such as trifluralin with care as they can adversely affect germination and crop establishment.
- Ensure that phosphorus levels available to the seed are adequate to maximise early vigour.
- Apply post-emergent herbicides at the correct growth stage.

## Storage conditions and duration

The longer grain is stored, the more the seed germination and vigour is decreased. This decrease is largely dependent on seed moisture and the temperature during storage. The higher either of these parameters; the quicker seed viability declines. Grain moisture is likely to have a more profound effect on the germination of the grain than the temperature at which the grain is stored. For further information please refer to Farmnote 302/2008, Grain storage: Maintaining grain quality.

## Agzone performance

Agzones have been developed through statistical performance to group together environmental regions that give similar crop performance. Agzones have been labelled 1 to 6 and are outlined in Figure 1.

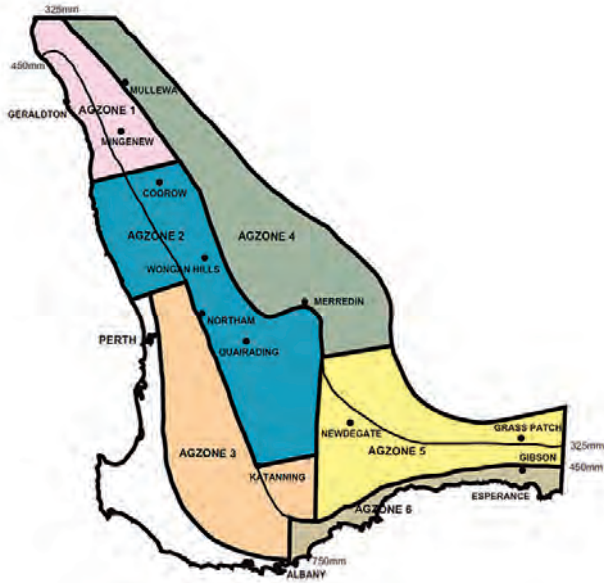


Figure 1 Agzones of Western Australia

## Long term wheat yields

The National Variety Trials (NVT) provides Estimated Genetic Values (EGVs) of grain yield for commercial varieties. Estimates of genetic value (yield) of individual varieties (on a state or region basis) are obtained from a statistical analysis of long term multi-environment trial (MET) data. These values represent the best available predictions for the specified region and are provided to facilitate reliable variety selection decisions (Table 1).

Table 1 Predicted yields of varieties in NVT trials from 2009 to 2013, expressed as a percentage of Mace<sup>(b)</sup>.

Grade	AGZONE 1		AGZONE 2		AGZONE 3		AGZONE 4		AGZONE 5		AGZONE 6		
	Mace (t/ha)	(29)	2.82	(74)	2.83	(22)	4.05	(31)	1.99	(29)	2.45	(15)	3.39
	Variety	%	n	%	n	%	n	%	n	%	n	%	n
AH	Bonnie Rock <sup>(b)</sup>	94	29	94	74	94	22	93	31	91	29	94	15
	Carnamah	92	23	91	58	95	17	89	25	90	23	94	12
	Cascades	86	14	85	28	94	8	81	11	84	12	93	7
	Cobra <sup>(b)</sup>	99	19	98	43	103	18	93	18	95	20	104	9
	Emu Rock <sup>(b)</sup>	94	22	96	58	96	18	98	23	97	23	94	12
	King Rock <sup>(b)</sup>	94	23	94	58	94	17	93	25	91	23	94	12
	Sapphire <sup>(b)</sup>									86	12	91	12
	Tammarin Rock <sup>(b)</sup>	93	14	92	28	91	8	93	11	92	12	91	7
Yitpi <sup>(b)</sup>	85	23	88	59	96	18	87	23	93	24	95	13	
APW	Annuello <sup>(b)</sup>									92	12	98	7
	Corack <sup>(b)</sup>	104	22	103	58	101	18	104	23	100	23	100	12
	Correll <sup>(b)</sup>	84	7	87	16	96	4	87	8	94	18	95	10
	Envoy <sup>(b)</sup>	88	16	92	58	97	22	92	21	96	29	98	15
	Espada <sup>(b)</sup>	94	29	94	74	98	22	93	31	94	29	97	11
	Estoc <sup>(b)</sup>	87	16	90	41	98	18	88	18	95	22	97	10
	Fang <sup>(b)</sup>	81	7	82	16	93	4	80	8	88	17	92	9
	Gladius <sup>(b)</sup>	86	14	87	23	90	4	88	11	89	7	88	3
	Harper <sup>(b)</sup>			90	15	98	5			95	6	98	3
	Katana <sup>(b)</sup>	92	23	94	58	96	17	94	25	95	23	94	12
	Magenta <sup>(b)</sup>	96	29	95	74	102	22	91	31	95	29	101	15
	Scout <sup>(b)</sup>	84	22	89	66	100	22	88	27	98	29	101	15
	Westonia	97	29	97	74	99	22	96	31	96	29	98	15
	Wyalkatchem <sup>(b)</sup>	97	29	97	74	97	22	96	31	96	29	98	15
Young <sup>(b)</sup>	90	14	92	28	95	8	93	11	95	12	94	7	
Zippy <sup>(b)</sup>	83	19	87	43	80	12	92	19	86	17			
TBC	Trojan <sup>(b)</sup>	89	3	91	15	102	10	87	6	95	12	103	6
APW-imi	Clearfield Stt <sup>(b)</sup>	86	16	86	41	96	9	83	18	89	14	95	9
	Grenade CL Plus <sup>(b)</sup>	85	15	86	46	91	14	86	20	89	17	89	8
	Justica CL Plus <sup>(b)</sup>	86	22	88	58	95	18	86	24	91	23	94	12
ASWN	Arrino	94	23	94	58	91	17	94	24	90	12		
	Binnu <sup>(b)</sup>	97	14	97	28	95	8	95	11	92	12	96	7
	Calingiri	91	29	91	74	98	22	88	31	91	29	97	12
	Fortune <sup>(b)</sup>	91	29	91	74	99	22	89	31	94	29	97	15
	Yandanooka <sup>(b)</sup>	88	29	88	74	92	22	86	30	88	12		
ASFT	Bullaring <sup>(b)</sup>			95	28	105	8	92	11	100	12		
	Kunjjin <sup>(b)</sup>			97	74	102	22	96	30	98	29	100	10
	Wedin <sup>(b)</sup>			88	58	101	18	85	24	94	23	101	10

(x) and n = total number of trials

Table 2 Wheat variety summary for Western Australia, grouped according to grade

Grade	Variety	Breeder	Year of release	Maturity	Approved Grower Trading	Licensee	EPR (\$/t ex GST)	
AH	<b>Bonnie Rock<sup>Ⓛ</sup></b>	Intergrain	2002	Short	Yes#	Free to trade	\$2.50	
	COMMENTS: Also known as EGA Bonnie Rock <sup>Ⓛ</sup> . Aroona background. <b>Strengths:</b> Low risk for black point. Good resistance to leaf rust (MRMS). <b>Risks:</b> Very susceptible to stripe rust, so recommended in Agzones 1 & 4 only.							
	<b>Carnamah</b>	InterGrain	1996	Mid	Yes	Free to trade		
	COMMENTS: Former dominant variety in WA due to its broad adaptation, but acreage on decline as outperformed by newer varieties. <b>Strengths:</b> Good grain quality (low screenings). MRMS for stem rust. <b>Risks:</b> Can express leaf tip necrosis under stress conditions, S for stripe rust and susceptible to low falling numbers after pre harvest rain.							
	<b>Cobra<sup>Ⓛ</sup></b>	LPB	2011	Short-Mid	Yes#	Associate (PacSeeds)	\$3.50	
	COMMENTS: Westonia <sup>Ⓛ</sup> background. <b>Strengths:</b> Yielded well in NVT's grown on acid soils. Good resistance to both S. nodorum and yellow spot. <b>Risks:</b> Susceptible to stripe rust (MSS) and susceptible to low falling numbers after pre harvest rain, so not suitable for the south coast.							
	<b>Eagle Rock<sup>Ⓛ</sup></b>	InterGrain	2004	Mid	Yes	Free to trade	\$2.50	
	COMMENTS: Also known as EGA Eagle Rock <sup>Ⓛ</sup> . Sunelg background, awnless variety <b>Strengths:</b> Useful for weed management due to good metribuzin herbicide tolerance. Current benchmark for maintaining falling number after pre harvest rain. <b>Risks:</b> Lower yielding than leading WA varieties.							
	<b>Emu Rock<sup>Ⓛ</sup></b>	InterGrain	2011	Short	Yes#	Free to trade	\$3.50	
	COMMENTS: High yielding with Westonia and Kukri background. Shorter than Mace <sup>Ⓛ</sup> yet taller than Wyalkatchem <sup>Ⓛ</sup> . <b>Strengths:</b> Ideal for mid to short growing season. Useful tolerance to crown rot (MSS). Large grain size and durable stripe rust resistance. <b>Risks:</b> Susceptible to Septoria tritici and nodorum. Susceptible to low falling numbers after pre harvest rain. MSS to new leaf rust.							
<b>King Rock<sup>Ⓛ</sup></b>	InterGrain	2009	Short	Yes#	Free to trade	\$3.00		
COMMENTS: Bonnie Rock <sup>Ⓛ</sup> background. Similar yields and plant type to Bonnie Rock <sup>Ⓛ</sup> but has shorter coleoptile length. <b>Strengths:</b> Improved stripe rust resistance (RMR*) compared to Bonnie Rock <sup>Ⓛ</sup> (VS).								
<b>Mace<sup>Ⓛ</sup></b>	AGT	2008	Short-Mid	Yes^	AGT affiliates	\$3.00		
COMMENTS: Wyalkatchem <sup>Ⓛ</sup> background with higher grain yields. A new benchmark for yield in WA. Wide adaptation across regions and soil types. <b>Strengths:</b> Better disease resistance than Wyalkatchem <sup>Ⓛ</sup> . Superior to Wyalkatchem <sup>Ⓛ</sup> for falling number after pre harvest rain. Boron tolerance. <b>Risks:</b> High yielding so may require increased nitrogen fertilisation to prevent protein dilution.								
<b>Sapphire<sup>Ⓛ</sup></b>	GBA	2003	Mid	No	COGGO Seeds	\$3.00		
COMMENTS: Also known as GBA Sapphire <sup>Ⓛ</sup> . Janz background. <b>Strengths:</b> Maintains falling number after pre harvest rain, long coleoptile, good leaf and stem rust resistances (R* and RMR). <b>Risks:</b> Can have higher screenings than other varieties in a dry finish.								
<b>Tammarin Rock<sup>Ⓛ</sup></b>	InterGrain	2005	Short	Yes#	Free to trade	\$2.50		
COMMENTS: Yields similar to Bonnie Rock <sup>Ⓛ</sup> . <b>Strengths:</b> Fit for shorter growing season. Acid tolerance similar to Wyalkatchem <sup>Ⓛ</sup> . <b>Risks:</b> Susceptible to low falling number after pre harvest rain.								
<b>Yitpi<sup>Ⓛ</sup></b>	ARI	1999	Mid-Long	No	Seednet	\$1.00		
COMMENTS: Spear background. <b>Strengths:</b> Variety popular in southern areas due to its longer maturity and ability to avoid frost damage. Maintains falling number with pre harvest rain. Large grain, long coleoptile, is tolerant to CCN and Boron. <b>Risks:</b> Stem rust (S) and yellow spot (SVS). Not suited for wheat on wheat.								
APW	<b>Corack<sup>Ⓛ</sup></b>	AGT	2011	Short-mid	Yes^	AGT affiliates	\$3.00	
	COMMENTS: Wyalkatchem <sup>Ⓛ</sup> background. Consistent high yields across NVT's since 2010. Suited to late May, early June sowing. <b>Strengths:</b> Useful resistance to CCN (RMR) and stem rust (MR). <b>Risks:</b> Susceptible to powdery mildew and black point. Now also MS to new leaf rust strain. Risks mean Corack <sup>Ⓛ</sup> is less suitable to higher rainfall zones.							
	<b>Envoy<sup>Ⓛ</sup></b>	LPB	2011	Mid	Yes#	Seednet	\$2.80	
	COMMENTS: Yitpi <sup>Ⓛ</sup> background but earlier maturing. <b>Strengths:</b> Adapted to both acid and alkaline soils. Good resistances to leaf rust and stem rust (R). Maintains falling number after pre harvest rain, good fit for the south coast. <b>Risks:</b> Susceptible to yellow spot (MSS) and powdery mildew (S).							
<b>Estoc<sup>Ⓛ</sup></b>	AGT	2010	Mid – Long	Yes^	AGT affiliates	\$3.00		
COMMENTS: Yitpi <sup>Ⓛ</sup> background. Mid to long maturity like Yitpi <sup>Ⓛ</sup> , usually flowering 1-2 days earlier than Yitpi <sup>Ⓛ</sup> with similar flowering pattern. <b>Strengths:</b> Similar maintenance of high falling number and boron tolerance to Yitpi <sup>Ⓛ</sup> , moderately resistant to stem rust (RMR) compared to S for Yitpi <sup>Ⓛ</sup> . <b>Risks:</b> Susceptible to yellow spot.								
<b>Harper<sup>Ⓛ</sup></b>	Intergrain	2013	Mid-Long	Yes	Free to trade	\$3.80		
COMMENTS: Yitpi <sup>Ⓛ</sup> background. Slightly earlier maturity than Yitpi <sup>Ⓛ</sup> . <b>Strengths:</b> A robust rust resistance package. Similar sprouting and blackpoint tolerance to Yitpi <sup>Ⓛ</sup> . <b>Risks:</b> Susceptible to powdery mildew.								



Table 2 (cont) Wheat variety summary for Western Australia, grouped according to grade

Grade	Variety	Breeder	Year of release	Maturity	Approved Grower Trading	Licensee	EPR (\$/t ex GST)
APW (cont)	<b>Magenta<sup>Ⓛ</sup></b> COMMENTS: Suited to early to mid sowing opportunities. <b>Strengths:</b> Yields similar to Wyalkatchem <sup>Ⓛ</sup> , with long coleoptile, good resistances to stem rust (RMR), leaf rust (R*) and yellow spot (MR). Good option for wheat on wheat. Excellent early vigour. <b>Risks:</b> Susceptible to low falling number after pre harvest rain hence not suited to south coast.	InterGrain	2007	Mid-Long	Yes#	Free to trade	\$3.00
	<b>Scout<sup>Ⓛ</sup></b> COMMENTS: Yitpi <sup>Ⓛ</sup> background but maturity is similar to Carnamah. <b>Strengths:</b> Adapted to both acid and alkaline soils. Good resistances to stripe rust (RMR*) and leaf rust (R). Maintains falling number after pre harvest rain. <b>Risks:</b> Susceptibility to yellow spot (SVS). Not suited for wheat on wheat.	LPB	2009	Mid	Yes	Associate (PacSeeds)	\$2.80
	<b>Westonia</b> COMMENTS: Former dominant variety in WA due to its broad adaptation, acreage on decline. <b>Strengths:</b> Yields comparable to Wyalkatchem <sup>Ⓛ</sup> , good aluminium tolerance. <b>Risks:</b> Stem rust (SVS) and stripe rust (VS). Marginal for hectolitre weight, susceptible to low falling number after pre harvest rain.	InterGrain	1997	Short	Yes	Free to trade	
	<b>Wyalkatchem<sup>Ⓛ</sup></b> COMMENTS: Formerly the yield benchmark being widely replaced by Mace <sup>Ⓛ</sup> . <b>Strengths:</b> Suitable for wheat on wheat system due to resistances to yellow spot and stubble management. Acid soil tolerant and low screenings. <b>Risks:</b> Short coleoptile length and less competitive with weeds due to poor early vigour. Susceptible to one strain of stem rust that occurs in WA, stripe rust (S) and now MS to new leaf rust strain. Susceptible to low falling number with pre harvest rain.	InterGrain	2001	Short-Mid	Yes	Free to trade	\$1.92
TBC	<b>Trojan<sup>Ⓛ</sup></b> COMMENTS: For medium to high rainfall areas <b>Strengths:</b> Very good rust package with stripe rust (MR), stem rust (MRMS) and leaf rust (MR). Boron tolerant (MT). <b>Risks:</b> Mid late maturity like Magenta <sup>Ⓛ</sup> so not suited to low rainfall areas unless growers are avoiding frost risk periods.	LPB	2013	Mid – Long	No	Associate (PacSeeds)	\$4.00
APW-Imi	<b>Grenade CL Plus<sup>Ⓛ</sup></b> COMMENTS: Spear background mid maturing variety with two imi-tolerance genes. <b>Strengths:</b> Weed control option and better suited to the medium to low rainfall zones when compared to Justica CL Plus <sup>Ⓛ</sup> . Good resistance to stem and stripe rusts (MR and RMR*). R to CCN and Boron tolerant. <b>Risks:</b> Susceptible to yellow spot (S).	AGT	2013	Mid	No	AGT affiliates	\$3.80
	<b>Justica CL Plus<sup>Ⓛ</sup></b> COMMENTS: Spear background with two imi-tolerance genes. <b>Strengths:</b> Weed control option and better suited to the medium to high rainfall regions especially south of the Great Eastern Highway. Good resistance to stem and stripe rusts (MR and RMR*) and tolerant of boron. Maintains high falling number. <b>Risks:</b> Susceptibility to powdery mildew (MS), yellow spot (S) and S. tritici (SVS). Moderate hectolitre weight.	AGT	2011	Mid-Long	No	AGT affiliates	\$3.55
ASWN	<b>Arrino</b> COMMENTS: Eradu background. <b>Strengths:</b> Preferred ASWN for low rainfall areas and later sowings. <b>Risks:</b> Susceptible to low falling number after pre harvest rain, and stem (SVS) and stripe rust (S).	InterGrain	1997	Short-Mid	Yes	Free to trade	
	<b>Calingiri</b> COMMENTS: Kulin and Reeves background. <b>Strengths:</b> Preferred ASWN wheat for high rainfall areas and earlier sowings. <b>Risks:</b> Susceptible to current strain of stem and stripe rust (S).	InterGrain	1997	Long	Yes	Free to trade	
	<b>Fortune<sup>Ⓛ</sup></b> COMMENTS: Calingiri background. Suited for early sowing opportunities. <b>Strengths:</b> Superior ASWN quality compared and better disease package than Calingiri. <b>Risks:</b> More susceptible to low falling numbers than Calingiri.	InterGrain	2008	Long	Yes	Free to trade	\$3.00
ASFT	<b>EGA 2248<sup>Ⓛ</sup></b> COMMENTS: Halberd and Tincurrin background. <b>Strengths:</b> High yielding, non club, soft wheat. <b>Risks:</b> High protein, and susceptible to stripe rust (S), leaf rust (MS), yellow spot (SVS), S. nodorum (S) and S. tritici (S).	InterGrain	2004	Short-Mid	Yes	Free to trade	\$3.62
	<b>Kunjini<sup>Ⓛ</sup></b> COMMENTS: Background similar to EGA2248 <sup>Ⓛ</sup> . <b>Strengths:</b> Better than EGA 2248 <sup>Ⓛ</sup> for leaf and stripe rust resistance. <b>Risks:</b> High protein similar to EGA 2248 <sup>Ⓛ</sup> .	InterGrain	2010	Short-mid	Yes	Free to trade	\$3.50
	<b>Wedin<sup>Ⓛ</sup></b> COMMENTS: Corrigin and Datatine background. <b>Strengths:</b> Good resistance to stem (RMR) and leaf rust (R*). <b>Risks:</b> Protein levels slightly higher than EGA 2248 <sup>Ⓛ</sup> . Susceptible to powdery mildew	InterGrain	2010	Mid-Long	Yes	Free to trade	\$3.50

Varieties included on the basis of at least 1% of area sown in any port zone or released in the last three years with seed commercially available.

<http://www.nvtonline.com.au/variety-brochures>.

Breeding organisation acronyms: **ARI** – Adelaide University; **AGT** – Australian Grain Technologies; **COGGO** – Council of Grain Grower Organisations Ltd.; **GBA** – Grain Biotechnology Australia; **LPB** – Long Reach Plant Breeders Pty Ltd.

\*Some races in eastern states can attack these varieties. Refer to Table 3 for full disease rating.

# Approved for farmer to farmer trading in accordance with the Industry Standard Seed License & Royalty Agreement. Contact InterGrain David Meharry – 0427 855 059 or Pacific Seeds – 07 4690 2666 for enquiries.

^Grower to grower sales via seed sharing permitted as long as seller purchased original Seed from AGT Affiliate or Retailer Contact AGT Nick Joyce 0488 303 070 for enquiries.

For a more extensive list for EPR visit <http://varietycentral.com.au>.

Table 3 Disease resistance ratings, quality and agronomic traits for wheat varieties grown in WA in 2013

Grade	Variety	Septoria nodorum	Septoria tritici blotch	Yellow spot	Stem rust	Stripe rust	Leaf rust	Powdery mildew	Flag smut	Common bunt	RLN (p.neglectus)	CGN <sup>a</sup>	Height	Coleoptile	Blackpoint	Falling Number	
AH	Bonnie Rock <sup>b</sup>	MSS	SVS	MRMS	MS	VS	MRMS	S	S	MS	S	S	M	M	MRMS	4	
	Carnamah	MS	S	MSS	MRMS	S	MS#	MSS	MSS	MS	S	S	M	M	MS	2	
	Cascades	MSS	MSS	MS	SVS	SVS	SVS	S	MS	MS	MRMS	S	M	M	MRMS	5	
	Cobra <sup>b</sup>	MRMS	MSS	MRMS	RMR	MSS	MR#	MSS	MS	S	S	MRMS	M		MS <sup>^</sup>	2	
	Eagle Rock <sup>b</sup>	MRMS	S	S	MR	MS	MS	MRMS	S	MRMS	MSS	S	M	S/M	MS	6	
	Emu Rock <sup>b</sup>	SVS	S	MRMS	MRMS	MSS	MSS	MSS	R	MSS	MSS	MS	S	M/L	MS <sup>^</sup>	2	
	Janz	S	MS	S	RMR	MS	MS	MSS	MR	S	S	S	S/M	M	MS	3	
	King Rock <sup>b</sup>	MSS	S	MRMS	MRMS	MSS	RMR*	MSS	VS	MS	MSS		M	S	MRMS	4	
	Mace <sup>b</sup>	MS	S	MRMS	MR	MSS	RMR*	MR#	MSS	MSS	R	MS	MRMS	M	MS	5	
	Sapphire <sup>b</sup>	MSS	MRMS	MSS	RMR	MS	MS	R*	MS	MRMS	MS	S	S	M	MS	5	
	Tammarin Rock <sup>b</sup>	MSS	SVS	SVS	MS	MSS	MSS	MS	MS	RMR	MR	MS		M	MS	3	
	Yitpi <sup>b</sup>	MRMS	MRMS	SVS	S	MRMS	MSS	MSS	MRMS	MR	S	MSS	MR	M	L	MS	5
	Yitpi <sup>b</sup>	MS	MRMS	MSS	RMR	MSS	MSS	R*	MR	MRMS	S	MSS	R	M	M/L	MRMS	5
	Yitpi <sup>b</sup>	SVS	SVS	S	MS	MS	RMR	MR	MRMS	MR	MRMS	MSS	S	S/M	M	S <sup>^</sup>	2
	Axe <sup>b</sup>	MSS	MSS	(MR)	MR	MS	MS	MS	SVS	MRMS	MS	MS	RMR	M		MSS <sup>^</sup>	4
Corack <sup>b</sup>	S	SVS	SVS	MRMS	MRMS	MRMS	MSS	MRMS	R	MS	S	MR	M	M/L	MS	2	
Correll <sup>b</sup>	MRMS	S	S	MR	MR	RMR*	MRMS	MS	R	MSS	SVS		M/T	MS	MS	4	
Endure <sup>b</sup>	MSS	MSS	(MSS)	MR	MR	R*	R	S	R	MRMS	VS	MRMS	M			5	
Envoy <sup>b</sup>	MS	S	MS	MR	MR	R*	R	MSS	MR	MS	S	MS	M	S	S <sup>^</sup>	2	
Espada <sup>b</sup>	MS	S	MSS	MR	MR	MR*	MRMS	MRMS	MR	MR	VS <sup>^</sup>	MR	M		MS	6	
Estoc <sup>b</sup>	MS	SVS	MSS	MRMS	MRMS	R*	MRMS	S	R	MSS	VS		M	M/L		5	
Fang <sup>b</sup>	MS	MSS	SVS	MS	MS	MS	MS	MRMS	RMR	MS	MSS	MR	M	VL	MS	5	
Frame	MSS	SVS	MS	MR	MR	RMR*	MRMS	MSS	MR	S	S	MS	M	M	MS	2	
Gladus <sup>b</sup>	MSS	SVS	S	MRMS	MRMS	RMR	MRMS	S	RMR	MSS	S <sup>^</sup>	MRMS	M		RMR	5p	
Harper <sup>b</sup>	MS	SVS	MR	MS	MS	VS	R*	S	MR	S	MS	S	M	S	MS	3	
H45 <sup>b</sup>	SVS	SVS	MS	MS	MRMS	MRMS	MS	MS	MRMS	S	S <sup>^</sup>	S	M	VL		5	
Halberd	MS	MS	MS	MSS	MRMS	MRMS	MS	MSS	MSS	MR	SVS	MS	M	S <sup>^</sup>		2	
Katana <sup>b</sup>	MS	MS	MS	MSS	MRMS	MRMS	MS	MSS	MSS	MR	SVS	MS	M	S <sup>^</sup>		2	

Table 3 (cont) Disease resistance ratings, quality and agronomic traits for wheat varieties grown in WA in 2013

Grade	Variety	Septoria nodorum blotch	Septoria tritici blotch	Yellow spot	Stem rust	Stripe rust	Leaf rust	Powdery mildew	Flag smut	Common bunt	RLN (p.neglectus)	CCN <sup>a</sup>	Height	Coleoptile	Blackpoint	Falling Number Index
TBC	Magenta <sup>b</sup>	MRMS	MRMS	(MR)	RMR	MS	R*	MRMS	MSS	S	MSS	MSS	M	VL	MS	3
	Scout <sup>b</sup>	S	MSS	SVS	MR	RMR*	R	MS	R	MS	MSS	R	M		S^	6
	Spears	S	MSS	SVS	MS	MSS	SVS	S	MR	MS	S	S	M/T	M	MRMS	5
	Stiletto	MS	MSS	SVS	MR	MSS	S	MS	MS	MS	MS	S	M	M	MS	5
	Westonia	MSS	SVS	MSS	SVS	VS	MS	S	SVS	S	S	S	M	M	MS	2
	Wyalkatchem <sup>b</sup>	MS	S	(MR)	MS	S	MS	S	S	RMR	MRMS	MRMS	S	S	MS	3
	Zippy <sup>b</sup>	S	S	MSS	MRMS	MSS	MRMS	MS	RMR	MR	MR	S		M	MS	4
	Trojan <sup>b</sup>	MSS	S	MSS	MRMS	MR	MR	SVSp	SVS	MRMS	MRMS	S	MS	M	MRMS	4p
	Clearfield Stl <sup>b</sup>	MRMS	S	MSS	MR	S	SVS	SVS	MSS	MS	MS	S	M/T	S	MRMS	6
	Grenade CL Plus <sup>b</sup>	MSS	MSS	S	MR	RMR	MS	MS	MR	MR	SVS	S^	R	M	MS^	4p
APW-Intl	Justica CL Plus <sup>b</sup>	MS	SVS	S	MR	RMR*	MSS	MS	R	SVS	VS^	MS	M		MS^	4p
	Arriho	MSS	MRMS	MSS	SVS	S	MSS	MR	MSS	MS	S	S	M	S	MS	2
	Binnu <sup>b</sup>	MSS	MSS	MSS	S/RMR	R*	MS	MRMS	MSS	S	S	M	M	M	MSS	5
ASWN	Calingiri	MS	MSS	(MS)	S	S	MS	MSS	RMR	MR	S	S	M	S	MS	5
	Eradu <sup>b</sup>	SVS	SVS	S	MR	SVS	S	MRMS	MSS	S	MS	MS	M/T	M	SVS	2
	Fortune <sup>b</sup>	MSS	MRMS	MS	MS	MS	MRMS	MRMS	R	MR	MS	MS	M	S/M	MRMS	2
	Yandanooka <sup>b</sup>	MSS	MSS	MS	MRMS	S	RMR	MRMS	MR	MS	MSS	MS	T	M	MRMS	2
	Bullaring	MSS	MR	SVS	RMR	MS	MS	S	RMR	S	MSS	MSS	S/M	M/L	MS	2
ASFT	EGA 2248 <sup>b</sup>	S	S	SVS	MRMS	S	MS	S	MS	MS	MSS	MSS	M/T	M		3
	Kunjin <sup>b</sup>	MSS	S	S	MRMS	MS	MRMS	S	S	MSS	SVS^	SVS^	M/T	M/L	MSp	2
	Wedin <sup>b</sup>	S	MR	S	RMR	MS	R*	S	MRMS	MSS	MS	MS	M	S	MSSp	2

**Disease ratings:** VS = Very susceptible, SVS = Susceptible to very susceptible, S = Susceptible, MSS = Moderately susceptible to susceptible, MS = Moderately susceptible, MRMS = Moderately resistant to moderately susceptible, MR = Moderately resistant, RMR = Resistant to moderately resistant, R = Resistant. No score = no rating is currently available. p = Provisional assessment. / = Scores separated by / indicate the response to the 'currently predominant' and 'alternate' strains of stem rust existing in WA. \* = Some races in eastern Australia can attack these varieties. # = May be more susceptible to the new leaf rust pathotype. ( ) = Higher disease at some sites. Combined RLN ratings from DAFWA, SARDI (\*), DPI Vic and DEEDI data. **CCN ratings** from SARDI, Wallwork and Zwer (2013) Cereal Variety Disease Guide 2013, Factsheet Feb 2013. **R**=resistant – nematode numbers will decrease when this variety is grown. **MR**=moderately resistant – nematode numbers will slightly increase when this variety is grown. **MS**=moderately susceptible – nematode numbers will slightly increase when this variety is grown. **S**=susceptible – nematode numbers will increase greatly when this variety is grown. **Height ratings:** S = short (<70cm), M=medium (70-85cm) and T=tall (>85cm). **Coleoptile ratings:** S=short(<60mm), M=medium (60-69mm), L=long (70-79mm), VL=very long (>79mm). Coleoptile data not updated from 2011. **Black point ratings** using DAFWA data 1997-2009, 2011 data from D Mares (University of Adelaide) and 2013 from H Wallwork (\* SARDI). **Falling Number Index:** germination index data has been used along with falling number from field experiments to give an indication of the likelihood of maintaining falling number after a harvest rain. 9=most likely to maintain FN, 1=least likely.

Low risk Medium Risk High risk

## 2013 Northern Agricultural Region (NAR) Summary

The 2013 season had a good start in May, very low rainfall in mid-winter but above average rains in late winter and early spring. The dry conditions in winter reduced yield potential for many crops however the later rains were very important to maintain productivity at average to below average for many growers.

Staining was an issue for some growers in high risk areas but small grain screenings were not a major issue in 2013. In 2013, the longer maturing varieties performed better than the earlier maturing varieties, in general.

The majority of NVT's in the Northern Ag Region were sown in the third and fourth weeks of May. These sowing times will reflect district practice in 2013. However some growers had sowed wheat into dry soil, which would have emerged in the second week of May.

### NVT's and new wheats in the NAR

(Refer to Tables 4, 5 and 6)

#### AH

In 2013 Mace<sup>®</sup> was ranked first in four of the six NVT's in Agzone 1 and all three NVT's in Agzone 4. In Agzone 2, Cobra<sup>®</sup> was ranked first in four of the seven NVT's. Analysis of the NVT database (Zaicou-Kunesch, 2014 Crop Updates) indicates that Cobra<sup>®</sup> yields better when sown before the end of May and in higher rainfall environments. However, Cobra<sup>®</sup> is susceptible to low falling numbers following pre-harvest rain. Staining affected grain quality in Cobra<sup>®</sup> but not Mace<sup>®</sup>, at agronomy trials in Binu sown on 8 May.

Emu Rock<sup>®</sup> was one of the lower ranked varieties in 2013 in all agzones. In contrast, in 2012 Emu Rock<sup>®</sup> was one of the highest ranked varieties in Agzone 4. Sowing time of the NVT's differed between 2012 and 2013. In 2012 the NVT's were sown in the second week of June except at Yuna which was sown on 30 May. In 2013 the NVT's in Agzone 4 were sown in the third and fourth weeks of May.

#### APW

Magenta<sup>®</sup>, Corack<sup>®</sup> and Westonia each have different maturities but were the highest ranked APW's in Agzone 2, yielding similar or better than Mace<sup>®</sup>.

The NVT's in Agzone 2 were sown in the last week of May and the late September rains benefited the longer maturing Magenta<sup>®</sup>.

Corack<sup>®</sup> did not rank highly in Agzones 1 and 4 in 2013 compared to 2012, when it was the highest ranked variety in Agzones 1 and 2. Staining is a risk for Corack<sup>®</sup> so May sowings should be avoided in districts with a higher risk of staining.

Harper<sup>®</sup> is a recent release, mid to long maturity APW from InterGrain. In its first year of testing in NVT's, its yields were similar to Scout<sup>®</sup> but significantly lower than Magenta<sup>®</sup> and Mace<sup>®</sup> in Agzone 2. It was not tested in Agzones 1 and 4.

#### APW-imi

The imi-wheats are not highly ranked in the NVT's but provide a weed control option. In phenology trials in 2013 Grenade CL Plus<sup>®</sup> flowered two days earlier than Justica CL Plus<sup>®</sup> but similar to Mace<sup>®</sup>. Both clearfield plus varieties are susceptible to yellow spot leaf disease and staining.

#### Noodle wheats

Calingiri yielded 2% higher than Fortune<sup>®</sup> when averaged across all trials in each agzone in 2013. Fortune<sup>®</sup> has a better rust tolerance package than Calingiri but it is more susceptible to lower falling numbers after pre harvest rain.

#### Grain Quality

Screenings were less than 5% for the majority of varieties in the NVT across all trials. Hectolitre weight (averaged across all varieties) was an issue at some sites. It was below 74kg/hl at Mingenew, Buntine, Dandaragan, Eneabba and Mullawa NVT's. Hectolitre weights for Espada<sup>®</sup>, Grenade CL Plus<sup>®</sup>, Harper<sup>®</sup>, Justica CL Plus<sup>®</sup> and Yitpi<sup>®</sup> were below 74kg/hl (averaged across all NVT's in the NAR). A full summary of grain protein, hectolitre weights and screenings are available on the NVT website.

#### Summary

In 2013, the yield differences between the top ranked varieties were not as great as in the previous year. Mace<sup>®</sup> did rank consistently high but Wyalkatchem<sup>®</sup> and Magenta<sup>®</sup> are suitable alternatives if the protein above 11.5% is not achievable for the AH grade.

Magenta<sup>®</sup> was ranked highly in all agzones in the NAR because it benefited from the late spring rains in 2013. Low falling numbers with pre-harvest rain is a risk for that variety.

Corack<sup>®</sup> did not rank consistently high in the NAR compared to previous years. Staining is a risk for that variety so it will be suited to low risk areas.

Cobra<sup>®</sup> ranked highly in Agzone 2. Low falling numbers following pre-harvest rain will be a risk factor for Cobra<sup>®</sup> in high risk areas.



Table 4 Adjusted grain yield results (t/ha and % of Mace<sup>Ⓟ</sup>) of NVT trials in Agzone 1 in the Northern Agricultural Region, 2013

Grade	Location	Carnamah		Eradu		Mingenew		Morawa		Nabawa		Ogilvie	
		22-May	SL	17-May	SL	14-May	SL	21-May	L/LC	16-May	L	16-May	SL/L
	<b>Sowing date</b>												
	<b>Soil texture</b>	SL	SL	SL	SL	SL	L/LC	L	L	L	L	L	L
	<b>pH<sub>ca</sub> 0-10cm</b>	5.4	5	5	5.4	5.4	4.7	4.3	4.3	4.3	4.3	4.8	4.8
	<b>pH<sub>ca</sub> 10-60cm</b>	6.1	4.8	4.8	4.5	4.5	5.1	4.4	4.4	4.4	4.4	4.6	4.6
	<b>Previous rotation</b>	Canola	Canola	Canola	Lupins	Lupins	Wheat	Lupins	Lupins	Lupins	Lupins	Canola	Canola
	<b>Variety</b>	t/ha	%	t/ha	%	t/ha	%	t/ha	%	t/ha	%	t/ha	%
AH	Bonnie Rock <sup>Ⓟ</sup>	2.46	104	1.69	87	1.87	97	1.43	99	2.78	89	2.09	85
	Cobra <sup>Ⓟ</sup>	2.44	103	1.63	84	1.89	98	1.07	74	3.13	100	2.38	96
	Emu Rock <sup>Ⓟ</sup>	2.24	95	1.55	80	1.36	70	1.57	109	2.51	80	1.78	72
APW	Mace <sup>Ⓟ</sup>	2.36	100	1.94	100	1.93	100	1.44	100	3.14	100	2.47	100
	Yipji <sup>Ⓟ</sup>	2.30	97	1.53	79	1.34	69	1.21	84	2.96	94	1.83	74
	Corack <sup>Ⓟ</sup>	2.52	107	1.63	84	1.85	96	1.45	101	2.79	89	2.06	83
APW-Imi	Espada <sup>Ⓟ</sup>	2.48	105	1.63	84	1.67	87	1.24	86	3.04	97	2.24	91
	Magenta <sup>Ⓟ</sup>	2.70	114	1.97	102	1.90	98	1.21	84	3.32	106	2.24	91
	Scout <sup>Ⓟ</sup>	2.35	100	1.55	80	1.32	68	1.29	90	2.90	92	1.86	75
ASWN	Westonia	2.40	102	1.65	85	1.64	85	1.31	91	2.91	93	2.10	85
	Wyalkatchem <sup>Ⓟ</sup>	2.43	103	1.84	95	1.95	101	1.31	91	3.16	101	2.31	94
	Grenade CL Plus <sup>Ⓟ</sup>	2.20	93	1.56	80	1.57	81	1.44	100	2.48	79	1.97	80
ASWN	Justica CL Plus <sup>Ⓟ</sup>	2.48	105	1.57	81	1.65	85	1.42	99	2.94	94	2.07	84
	Calligiri	2.33	99	1.73	89	1.84	95	1.09	76	3.51	112	2.18	88
	Fortune <sup>Ⓟ</sup>	2.45	104	1.61	83	1.67	87	1.40	97	3.06	97	2.09	85
ASWN	Yandanooka <sup>Ⓟ</sup>	2.32	98	1.68	87	1.65	85	1.20	83	2.93	93	2.06	83
	Isd (t/ha)	0.13		0.10		0.14		0.26		0.22		0.14	
	CV (%)	3.1		3.4		4.7		12		4.1		3.8	

Key for soil texture: S = sand, SL = sandy loam, L = loam, LC = loamy clay and C = clay. " / " denotes a change at 10cm.

Table 5 Adjusted grain yield results (t/ha and % of Mace<sup>cb</sup>) of NVT trials in Agzone 2 in the Northern Agricultural Region, 2013

Grade	Location	Buntine		Calingiri		Coorow		Dandaragan		Eneabba		Miling		Wongan Hills	
		24-May	28-May	24-May	28-May	24-May	29-May	24-May	29-May	24-May	25-May	26-May	25-May	26-May	
Soil texture	SL/S	L	L	L/SL	S/S	S	S/S	S	LC	SL	SL	LC	SL		
pH <sub>ca</sub> 0-10cm	4.5	6	6	4.9	5.9	4.7	5.9	4.7	6.2	5.6	6.2	6.2	5.6		
pH <sub>ca</sub> 10-60cm	4.6	6.1	6.1	4.2	4.9	4.6	4.9	4.6	7.9	4.8	7.9	7.9	4.8		
Previous rotation	Lupins	Canola	Canola	Canola	Pasture	Canola	Pasture	Canola	Pasture	Canola	Pasture	Pasture	Canola		
Variety	t/ha	%	t/ha	%	t/ha	%	t/ha	%	t/ha	%	t/ha	%	t/ha	%	
Bonnie Rock <sup>cb</sup>	2.69	95	4.17	88	2.69	100	3.18	113	4.13	100	4.28	100	3.28	95	
Cobra <sup>cb</sup>	2.79	98	5.33	113	2.63	98	3.24	115	4.43	108	4.39	102	3.43	99	
Emu Rock <sup>cb</sup>	2.70	95	4.52	96	2.65	99	2.94	105	3.43	83	4.28	100	3.40	98	
Mace <sup>cb</sup>	2.84	100	4.73	100	2.68	100	2.81	100	4.12	100	4.29	100	3.46	100	
Yipji <sup>cb</sup>	2.42	85	4.73	100	2.52	94	2.53	90	3.15	76	3.94	92	2.89	84	
Corack <sup>cb</sup>	2.87	101	4.34	92	2.99	112	3.07	109	4.00	97	4.67	109	3.51	101	
Espada <sup>cb</sup>	2.73	96	4.59	97	2.93	109	3.17	113	4.04	98	4.19	98	3.34	97	
Harper <sup>cb</sup>	2.45	86	4.80	101	2.66	99	2.77	99	3.65	89	4.02	94	3.12	90	
Magenta <sup>cb</sup>	2.92	103	4.90	104	2.81	105	3.20	114	4.43	108	3.94	92	3.35	97	
Scout <sup>cb</sup>	2.36	83	4.73	100	2.54	95	2.57	91	3.58	87	4.43	103	2.93	85	
Westonia	2.78	98	4.71	100	2.90	108	3.28	117	4.25	103	4.10	96	3.32	96	
Wyalkatchem <sup>cb</sup>	2.78	98	4.48	95	2.80	104	2.89	103	3.99	97	4.17	97	3.42	99	
Grenade CL Plus <sup>cb</sup>	2.35	83	4.38	93	2.59	97	2.58	92	3.71	90	4.02	94	2.95	85	
Justica CL Plus <sup>cb</sup>	2.44	86	4.30	91	2.75	103	2.73	97	3.61	88	3.66	85	3.06	88	
Kunjiri <sup>cb</sup>	2.69	95	5.04	107	2.78	104	3.09	110	3.71	90	4.26	99	3.19	92	
Wedji <sup>cb</sup>	2.54	89	4.85	103	2.95	110	2.84	101	4.09	99	3.67	86	3.12	90	
Calingiri	2.71	95	4.82	102	2.89	108	3.12	111	3.87	94	4.07	95	3.33	96	
Fortune <sup>cb</sup>	2.52	89	4.58	97	2.77	103	3.15	112	3.79	92	4.14	97	3.26	94	
Yandanooka <sup>cb</sup>	2.68	94	4.96	105	2.64	99	3.11	111	3.79	92	4.13	96	3.12	90	
Isd (t/ha)	0.14		0.35		0.23		0.31		0.34		0.20		0.17		
CV (%)	3.1		4.4		4.8		6.1		5.3		2.9		3.1		

Key for soil texture: S = sand, SL = sandy loam, L = loam, LC = loamy clay and C = clay. " / " denotes a change at 10cm.

Table 6 Adjusted grain yield results (t/ha and % of Mace<sup>cb</sup>) of NVT trials in Agzone 4 in the Northern Agricultural Region, 2013

Grade	Location		Cadoux		Mullewa		Yuna		Agzone 4 Ave		
	Sowing date	Soil texture	27-May	17-May	16-May	t/ha	%	t/ha	%	t/ha	%
Grade			SL	L	L/C						
		pH <sub>ca</sub> 0-10cm	4.9	5.3	6.1						
		pH <sub>ca</sub> 10-60cm	4.8	5.9	6.9						
		Previous rotation	Canola	Pasture	Canola						
AH	Variety		t/ha	%	t/ha	%	t/ha	%	t/ha	%	
	Bonnie Rock <sup>cb</sup>		2.02	96	0.99	93	0.62	85	1.21	93	
	Cobra <sup>cb</sup>		2.06	98	0.92	86	0.52	71	1.17	90	
	Emu Rock <sup>cb</sup>		2.09	100	0.91	85	0.62	85	1.21	93	
	Mace <sup>cb</sup>		2.10	100	1.07	100	0.73	100	1.30	100	
	Yipi <sup>cb</sup>		2.07	99	0.92	86	0.53	73	1.17	90	
	Corack <sup>cb</sup>		2.01	96	0.90	84	0.68	93	1.20	92	
	Espada <sup>cb</sup>		2.17	103	0.98	92	0.72	99	1.29	99	
	Magenta <sup>cb</sup>		2.27	108	1.08	101	0.64	88	1.33	102	
	Scout <sup>cb</sup>		2.07	99	0.93	87	0.58	79	1.19	92	
APW	Westonia		1.89	90	0.99	93	0.64	88	1.17	90	
	Wyalkatchem <sup>cb</sup>		2.21	105	1.05	98	0.56	77	1.27	98	
	Grenade CL Plus <sup>cb</sup>		1.96	93	0.83	78	0.56	77	1.12	86	
	Justica CL Plus <sup>cb</sup>		2.02	96	0.89	83	0.68	93	1.20	92	
	Kunjin <sup>cb</sup>		2.06	98	0.87	81	0.52	71	1.15	88	
ASFT	Wedin <sup>cb</sup>		2.07	99	0.90	84	0.65	89	1.21	93	
	Calingiri		2.23	106	0.88	82	0.55	75	1.22	94	
	Fortune <sup>cb</sup>		2.09	100	0.95	89	0.54	74	1.19	92	
ASWN	Yandanooka <sup>cb</sup>		2.08	99	1.01	94	0.58	79	1.22	94	
	Isd (t/ha)		0.16		0.13		0.10				
	CV (%)		4.6		7.6		9.7				

Key for soil texture: S = sand, SL = sandy loam, L = loam, LC = loamy clay and C = clay. " / " denotes a change at 10cm.

## 2013 Central Agricultural Region (CAR) Summary

The 2013 season began with late summer and early autumn rains over much of the Central Agricultural Region (CAR). The only exception was the eastern wheatbelt where little moisture was available for sowing and even up to mid-June. Germination varied from uniform and even on moist soils, to very patchy and uneven in dry and drying seedbeds.

A few severe frost incidents were observed in areas south and west of Merredin; however it did not result in many crops cut for hay compared to the damaging frosts in 2012. With the more favourable 2013 season, a bumper wheat crop was harvested with average to above average grain production in much of the region. Wheat yield varied from 1.0–2.5t/ha in Agzone 4, to 2.0–4.5t/ha in Agzone 2 and above 5t/ha in Agzone 3.

Hail damage and early November storms affected harvest in areas west of Merredin however most wheat varieties including the widely grown Mace<sup>®</sup>, maintained good grain quality. Grain quality was generally good at 80 to 84kg/hl. High screenings and low protein in high yielding wheat was a concern in some situations, however on-farm blending helped to achieve premium grade. There were a few reports of low falling numbers in Calingiri wheat due to the wet harvest.

Mace<sup>®</sup> was the most widely grown variety in the region. The popularity of Mace<sup>®</sup> is justified due to its adaption to regional environments, consistent high yields in the NVT system over five years, good disease resistance and delivery as an AH variety.

### NVT's in the CAR

(Refer to Tables 7 and 8)

Cobra<sup>®</sup>, Corack<sup>®</sup>, Emu Rock<sup>®</sup>, Magenta<sup>®</sup>, Scout<sup>®</sup> and the new releases Harper<sup>®</sup> and Trojan<sup>®</sup> had yields similar or better than Mace<sup>®</sup> in the 15 NVT trials throughout the region (Agzones 2, 3 and 4).

Cobra<sup>®</sup> yielded well in 2013, yielding similar to Mace<sup>®</sup> in Agzones 2 and 4, and 14% higher in Agzone 3 (York and Narrogin), where the average yields were over 5t/ha.

Emu Rock<sup>®</sup>, an early maturing AH variety, yielded similar to Mace<sup>®</sup> across the region except at Cunderdin, where Mace<sup>®</sup> significantly out yielded all the named varieties at that site. Emu Rock<sup>®</sup> may be a good option for growers seeking an early maturing AH variety particularly in low rainfall areas (Agzone 4).

Scout<sup>®</sup> was the highest yielding APW variety, outyielding Mace<sup>®</sup> by 7% across the region. Corack<sup>®</sup> was 5% higher yielding than Mace<sup>®</sup> in Agzones 2 and 4 but yielded similar in Agzone 3.

The new variety Harper<sup>®</sup> (APW) yielded 5% better than Mace<sup>®</sup> in Agzone 3 but was similar in Agzone 2. Harper<sup>®</sup> was not tested in Agzone 4.

New variety Trojan<sup>®</sup> was not tested in Agzones 2 and 4 but yielded the highest, 9% better than Mace<sup>®</sup> both at York and Narrogin (Agzone 3). Trojan<sup>®</sup> is yet to be classified in WA but looks promising for both low and medium rainfall areas in 2014 agronomy trials.

## Influence of sowing time on yield of varieties: Wickepin Agzone 2 and Merredin Agzone 4

(Refer to Table 9)

At Merredin grain yields averaged 2t/ha across all cultivars and three times of sowings. There where no significant effect of varieties or sowing time or the interaction on grain yield, probably due to the 2013 season at Merredin, in particular the good spring rainfall (Sep–Oct 63mm).

Similarly at Wickepin, May and June sowings had no significant effect on grain yield which was also due to the better than average 2013 season. But the effect of variety was significant.

Overall the new wheat variety Trojan<sup>®</sup> yielded the highest, averaging 17% and 8% better than Mace<sup>®</sup> at the Merredin and Wickepin sites respectively.

Although there was no significant sowing time by variety interaction, Magenta<sup>®</sup> and Trojan<sup>®</sup> were ranked the highest at the first sowing times at both sites. Conversely Mace<sup>®</sup> ranked the highest at the later sowings in June.

For comments on Trojan<sup>®</sup>'s maturity please refer to the introduction section.



Table 7 Adjusted grain yield results (t/ha and % of Mace<sup>o</sup>) of NVT trials in Agzones 2 and 3 in the Central Agricultural Region, 2013

Grade	Agzone 2										Agzone 3												
	Location	Beverley	Corrigin	Cunderdin	Goomalling	Kullin	Narembeen	Wickepin	Narrogin	York	Agzone 2 Ave	Agzone 3 Ave											
Sowing date	24-May	18-May	18-May	18-May	27-May	20-May	10-May	19-May	28-May	14-May													
Soil texture	S	L	L/SL	L	SL	SL	SL	L	SL/L	SL/L													
pH <sub>ca</sub> 0-10cm	5.1	5.5	5.1	5.4	5.4	4.8	5.3	5.4	5.1	5.2													
pH <sub>ca</sub> 10-60cm	5.9	4.3	7.6	5.0	5.0	5.7	4.1	6.9	4.7	5.0													
Previous rotation	Canola	Canola	Pasture	Pasture	Pasture	Pasture	Pasture	Pasture	Canola	Canola													
Variety	t/ha	%	t/ha	%	t/ha	%	t/ha	%	t/ha	%	t/ha	%											
AH	Bonnie Rock <sup>o</sup>	4.47	99	2.68	102	3.17	93	3.67	97	3.59	94	2.03	97	3.68	100	3.33	97	5.44	94	5.55	108	5.50	100
	Cobra <sup>o</sup>	4.83	107	2.88	110	3.06	90	4.05	107	3.83	101	2.05	98	4.00	109	3.53	103	6.68	115	5.81	113	6.25	114
	Emu Rock <sup>o</sup>	4.65	103	2.86	109	2.90	85	3.73	98	3.66	96	1.83	87	4.15	113	3.40	99	5.72	99	5.00	97	5.36	98
	Mace <sup>o</sup>	4.51	100	2.63	100	3.40	100	3.79	100	3.81	100	2.10	100	3.67	100	3.42	100	5.79	100	5.15	100	5.47	100
	Yitpi <sup>o</sup>	4.43	98	2.85	108	2.73	80	3.77	99	3.63	95	2.23	106	4.12	112	3.39	99	5.81	100	5.12	99	5.47	100
APW	Corack <sup>o</sup>	4.81	107	3.07	117	3.12	92	3.86	102	3.98	104	2.00	95	4.23	115	3.58	105	5.83	101	5.29	103	5.56	102
	Envoy <sup>o</sup>																						
	Espada <sup>o</sup>	4.54	101	2.89	110	2.92	86	3.61	95	3.77	99	2.24	107	3.74	102	3.39	99	5.85	101	5.21	101	5.53	101
	Estoc <sup>o</sup>																						
	Harper <sup>o</sup>	4.64	103	2.78	106	2.99	88	3.72	98	3.57	94	2.09	100	3.99	109	3.40	99	6.00	104	5.47	106	5.74	105
APW-Imi	Magenta <sup>o</sup>	4.49	100	3.07	117	3.06	90	3.81	101	3.87	102	2.60	124	4.10	112	3.57	105	6.01	104	5.31	103	5.66	103
	Scout <sup>o</sup>	5.18	115	2.69	102	3.16	93	4.03	106	3.79	99	2.20	105	4.03	110	3.58	105	6.59	114	5.54	108	6.07	111
	Westonia	4.79	106	2.92	111	2.96	87	3.91	103	3.75	98	2.27	108	3.72	101	3.47	102	5.98	103	5.40	105	5.69	104
	Wyalkatchem <sup>o</sup>	4.44	98	2.83	108	3.18	94	3.77	99	3.79	99	2.14	102	3.72	101	3.41	100	5.97	103	5.46	106	5.72	104
	Trojan <sup>o</sup>																						
ASWN	Grenade CL Plus <sup>o</sup>	4.18	93	2.42	92	2.63	77	3.22	85	3.05	80	1.86	89	3.31	90	2.95	86	5.38	93	4.70	91	5.04	92
	Justica CL Plus <sup>o</sup>	4.26	94	2.58	98	2.77	81	3.50	92	3.33	87	2.08	99	3.70	101	3.17	93	5.43	94	5.12	99	5.28	96
	Calingiri	4.47	99	2.67	102	2.91	86	3.52	93	3.35	88	2.31	110	3.51	96	3.25	95	5.62	97	5.33	103	5.48	100
ASF	Fortune <sup>o</sup>	4.27	95	2.60	99	2.99	88	3.64	96	3.10	81	2.13	101	3.67	100	3.20	94	5.81	100	5.14	100	5.48	100
	Yandanooka <sup>o</sup>	4.30	95	2.75	105	2.73	80	3.56	94	3.03	80	2.06	98	3.76	102	3.17	93	5.32	92	4.88	95	5.10	93
	Kurjini <sup>o</sup>	4.78	106	3.21	122	2.73	80	3.87	102	3.62	95	2.41	115	3.84	105	3.49	102	5.79	100	5.27	102	5.53	101
CV (%)	Wedin <sup>o</sup>	4.17	92	2.84	108	2.63	77	3.57	94	3.14	82	2.46	117	3.43	93	3.18	93	5.90	102	5.38	104	5.64	103
	Isd (t/ha)	0.21		0.17		0.22		0.27		0.25		0.18		0.32		0.23		0.35		0.39		0.37	
	2.79		3.58		4.27		4.22		3.80		4.84		5.03		5.85		5.24						

Key for soil texture: S = sand, SL = sandy loam, L = loam, LC = loamy clay and C = clay. <sup>o</sup> denotes a change at 10cm. TBC= Still to be classified in WA.

Table 8 Adjusted grain yield results (t/ha and % of Mace<sup>o</sup>) of NVT trials in Agzone 5 in the Central Agricultural Region, 2013

Grade	Location		Bencubbin		Kellerberrin		Merredin		Moorine Rock		Mukinbudin		Wyalkatchem		Agzone 4 Ave		
	Sowing date	Soil texture	17-May	SL	13-May	SL	15-May	SL	24-Apr	S/SL	15-May	SL	17-May	SL			
			SL	6.1	5.1	4.7	4.7	7.7	6.3	5.6	5.4	6.5					
			4.8	5.4	5.4	4.2	4.2	6.3	5.6	5.6	6.5						
			Wheat	Wheat	Pasture	Pasture	Pasture	Wheat	Wheat	Wheat	Wheat	Canola					
			t/ha	%	t/ha	%	t/ha	%	t/ha	%	t/ha	%	t/ha	%	t/ha	%	
AH	Bonnie Rock <sup>o</sup>		2.23	92	4.18	97	2.70	89	1.23	113	2.36	91	1.36	104	2.34	95	
	Cobra <sup>o</sup>		2.27	93	4.22	98	2.76	91	1.08	99	2.78	107	1.40	107	2.42	98	
	Emu Rock <sup>o</sup>		2.35	97	4.23	99	2.90	96	1.09	100	2.78	107	1.28	98	2.44	99	
	Mace <sup>o</sup>		2.43	100	4.29	100	3.03	100	1.09	100	2.59	100	1.31	100	2.46	100	
	Yitpi <sup>o</sup>		2.20	91	3.97	93	2.92	96	1.18	108	2.52	97	1.41	108	2.37	96	
	Corack <sup>o</sup>		2.53	104	4.52	105	3.12	103	1.17	107	2.68	103	1.46	111	2.58	105	
	Espada <sup>o</sup>		2.28	94	4.06	95	2.87	95	1.25	115	2.81	108	1.50	115	2.46	100	
	Magenta <sup>o</sup>		2.25	93	3.94	92	2.99	99	1.05	96	2.75	106	1.60	122	2.43	99	
	Scout <sup>o</sup>		2.21	91	4.26	99	2.80	92	1.24	114	2.74	106	1.52	116	2.46	100	
	Westonia		2.25	93	4.02	94	2.83	93	1.08	99	2.60	100	1.21	92	2.33	95	
	Wyalkatchem <sup>o</sup>		2.29	94	4.17	97	2.87	95	1.15	106	2.55	98	1.37	105	2.40	98	
APW-Imi	Grenade CL Plus <sup>o</sup>		2.08	86	3.73	87	2.66	88	1.18	108	2.35	91	1.39	106	2.23	91	
	Justica CL Plus <sup>o</sup>		2.13	88	3.80	89	3.00	99	1.25	115	2.51	97	1.43	109	2.35	96	
	Callingiri		2.11	87	4.06	95	2.88	95	1.15	106	2.76	107	1.44	110	2.40	98	
ASWN	Fortune <sup>o</sup>		2.14	88	4.25	99	2.69	89	1.27	117	2.92	113	1.50	115	2.46	100	
	Yandanooka <sup>o</sup>		2.13	88	3.82	89	2.85	94	1.13	104	2.68	103	1.43	109	2.34	95	
	Kunjin <sup>o</sup>		2.29	94	4.04	94	2.92	96	1.25	115	2.66	103	1.60	122	2.46	100	
ASFT	Wedin <sup>o</sup>		2.04	84	3.67	86	2.90	96	1.24	114	2.59	100	1.56	119	2.33	95	
	Isd (t/ha)		0.17		0.23		0.19		0.11		0.35		0.21		0.21		
	CV (%)		4.41		3.25		3.99		5.07		7.94		8.40				

Key for soil texture: S = sand, SL = sandy loam, L = loam, LC = loamy clay and C = clay. " / " denotes a change at 10cm.

Table 9 The influence of sowing date on grain yield (t/ha and % Mace<sup>cb</sup>) of wheat varieties sown at Merredin and Wickepin in 2013

Grade	Merredin						Wickepin					
	7-May		22-May		5-Jun		16-May		11-Jun			
Variety	t/ha	%	t/ha	%	t/ha	%	t/ha	%	t/ha	%	t/ha	%
AH	Cobra <sup>cb</sup>	1.93	101	2.02	115	1.77	76	5.23	102	4.50	97	
	Eagle Rock <sup>cb</sup>	1.74	91	1.66	94	2.01	86	4.22	83	3.63	79	
	Emu Rock <sup>cb</sup>	1.98	104	2.66	151	1.91	82	4.95	97	3.56	77	
	Mace <sup>cb</sup>	1.91	100	1.76	100	2.34	100	5.11	100	4.62	100	
	Yitpi <sup>cb</sup>	2.07	108	2.22	126	1.47	63	4.91	96	3.92	85	
	Corack <sup>cb</sup>	1.99	104	2.34	133	2.09	89	5.06	99	4.28	93	
APW	Envoy <sup>cb</sup>	2.25	118	1.77	101	1.79	76	5.19	102	4.03	87	
	Estoc <sup>cb</sup>	2.44	128	2.01	114	1.25	53					
	Magenta <sup>cb</sup>	2.64	138	2.15	122	1.27	54	5.44	106	3.91	85	
	Scout <sup>cb</sup>	2.26	118	2.04	116	1.80	77					
	Westonia	2.11	110	2.05	116	1.51	65					
	Wyalkatchem <sup>cb</sup>	2.22	116	2.42	138	2.25	96	5.32	104	4.18	90	
TBC	Young <sup>cb</sup>	2.23	117	1.80	102	1.72	74	4.56	89	4.02	87	
	Trojan <sup>cb</sup>	2.32	121	2.81	160	1.91	82	5.84	114	4.62	100	
	Grenade CL plus <sup>cb</sup>	2.09	109	2.26	128	1.64	70	4.69	92	3.68	80	
APW-lmi	Justica CL plus <sup>cb</sup>	2.22	116	1.98	113	1.64	70	4.38	86	3.96	86	
	Calingiri	1.90	99	1.82	103	1.21	52	4.48	88	4.01	87	
ASWN	Fortune <sup>cb</sup>	1.85	97	1.93	110	2.01	86					
Variety	P-value (5%)		lsd (t/ha)		P-value (5%)		lsd (t/ha)		P-value (5%)		lsd (t/ha)	
TOS	ns		0.39		ns		2.20		<0.001		2.20	
Variety,TOS	ns		0.73		ns		0.42		ns		0.42	
CV%	ns		0.88		ns		1.72		ns		1.72	
	20.9				8.2							

Respective previous rotations = fallow and pasture; Respective growing season rainfall = 193mm and 286mm; Respective soil type = Red shallow loamy duplex and sandy loamy duplex; **TBC** = Still to be classified in WA

## 2013 Great Southern and Lakes Region Summary

The Great Southern and Lakes region were fortunate to experience an early May start to the season, following 60-70mm in April. However some crops may have struggled with the lack of rain in June. Rainfall varied throughout the region with deciles ranging from 1–5 during the season while the final growing season rainfall ranged between deciles 4–8. Rain in September was greatly appreciated, enabling the crops to finish well above their expected potential in many cases. A late frost occurred at the end of October which had a range of effects from no effect to a severe yield penalty or downgraded due to distorted grain.

Harper<sup>®</sup> and Trojan<sup>®</sup> were released in 2013. Both are mid to long season varieties with the potential to replace Yitpi. Harper<sup>®</sup> is an APW, while Trojan<sup>®</sup> is yet to be classified for WA (TBC).

### Wheat variety performance in NVTs

(Refer to Tables 10, 11 and 12)

#### AH/APW wheat

With the softer finish to the season and sowing times occurring in early to mid-May, other varieties ranked higher than Mace<sup>®</sup> in 2013. Cobra<sup>®</sup> in comparison was consistently amongst the highest yielding varieties at 10 NVT sites in the region, except at Mt Madden. Results from previous seasons have suggested that Cobra<sup>®</sup> performs better in high yielding environments and when sown before May 25 (Zaicou-Kunesch, Crop Update 2014). Cobra<sup>®</sup> is susceptible to preharvest rain, hence low sprouting tolerance.

Interestingly, even with the relatively early start to the season in 2013, longer maturing varieties did not perform better than early maturing varieties. Mid May sowing at Wickepin resulted in Emu Rock<sup>®</sup>, Yitpi<sup>®</sup> and Magenta<sup>®</sup> having similar yields (Table 10). Frost can dramatically change this outcome but in 2013 the frost event occurred late. However at a specific time of sowing trial in Katanning, shorter maturing varieties such as Emu Rock<sup>®</sup> and Kunjin<sup>®</sup> had yield penalties greater than 0.5t/ha when sown in mid-May, compared with early-June (Table 12).

Rankings did change between sites but overall Cobra<sup>®</sup> was the highest yielding in Agzone 2, followed by Scout<sup>®</sup>, Magenta<sup>®</sup>, Corack<sup>®</sup>, Harper<sup>®</sup> and Trojan<sup>®</sup> (at one site), with Bonnie Rock<sup>®</sup> last.

Cobra<sup>®</sup> was the highest yielding variety in Agzone 3, but not significantly higher than Mace<sup>®</sup> or Magenta<sup>®</sup> (Table 10). Compared to other Agzones Corack<sup>®</sup> did not perform as well. Note: Results from Agzone 3 need to be treated with caution as Kendenup had site issues (Rhizoctonia).

In Agzone 5 Mace<sup>®</sup>, Cobra<sup>®</sup>, Corack<sup>®</sup>, Wyalkatchem<sup>®</sup>, Magenta<sup>®</sup>, Harper<sup>®</sup> and Trojan<sup>®</sup> performed similarly overall.

#### Noodle wheat

Fortune<sup>®</sup> yielded similar to Calingiri in 2013. The noodle wheats were competitive with Mace<sup>®</sup> in Agzone 3, except for the shorter season Yandanooka<sup>®</sup> (Table 10).

#### Soft wheat

In Agzones 2 and 3, both Kunjin<sup>®</sup> and Wedin<sup>®</sup> were competitive with Mace<sup>®</sup> (Table 10). With the earlier sowings in Agzone 5, only Wedin<sup>®</sup> was competitive with Mace<sup>®</sup> (Table 11).

#### Grain Quality

A full summary of grain protein, hectolitre weights and screenings are available on the NVT website. No major issues were present in 2013 although Yitpi<sup>®</sup>, Cobra<sup>®</sup> and Harper<sup>®</sup> did have problems with hectolitre weights below 74kg/hl at Hyden and Wagin.

#### Summary

Overall, Mace<sup>®</sup> remains a consistent, high yielding AH choice in the Great Southern and Lakes region. The softer 2013 season showed the dominance of Cobra<sup>®</sup> which is prone to sprouting. APW types Magenta<sup>®</sup>, Corack<sup>®</sup> and Wyalkatchem are alternatives to Mace<sup>®</sup>, if protein above 11.5% is not met or with early May sowing opportunities in the case of Magenta<sup>®</sup>. The new mid to long season releases Harper<sup>®</sup> and Trojan<sup>®</sup> yielded higher than Yitpi<sup>®</sup>, and yielded similar to Magenta<sup>®</sup>. The new releases have the advantage of better sprouting tolerance compared to Magenta<sup>®</sup> and rust resistance compared to Yitpi<sup>®</sup>.

#### Effect of grazing on wheat varieties

(Refer to Table 12)

Trials were conducted at South Newdegate and Kojonup to examine the effect of grazing (and sowing time) on a range of varieties. Plots were “snipped” to 3-5 cm at approximately 6 and 8 weeks after sowing, to simulate a heavy 2 week grazing period. At the mid to late May sowings the varieties showed no difference in their response to the simulated grazing treatment. There was no significant yield decline with grazing at Newdegate when sown mid-May but significant declines were found at the later sowing and at the higher yielding site at Kojonup.

Grazing did delay the flowering time by nearly one week with a rule of thumb of 2 days grazing to 1 day delay. Full report in Crop Update 2014 proceedings (Delaying wheat flowering time through grazing to avoid frost damage (Part 2: Incorporating varieties and sowing time)).



Table 10 Adjusted grain yield results (t/ha and % of Mace<sup>(c)</sup>) of NVT trials in Agzones 2 and 3 in the Great Southern Region, 2013

Region	Agzone2						Agzone 3										
	Location	Wickepin	Narrogin	Wagin <sup>#</sup>	Gnowangerup	Kendenup <sup>#</sup>	Kojonup	Grade	Location	Wickepin	Narrogin	Wagin <sup>#</sup>	Gnowangerup	Kendenup <sup>#</sup>	Kojonup	Agzone 3 Ave	
	Sowing Date	19-May	28-May	9-May	28-May	17-May	23-May		19-May	28-May	9-May	28-May	17-May	23-May			
	Soil texture	L	LC	SL	LC	SL	SL		L	LC	SL	SL	SL	SL			
	pH <sub>Ca</sub> 0-10cm	5.4	5.1	4.7	5.1	4.7	5.1		5.4	5.1	4.7	4.9	4.5	5.1			
	pH <sub>Ca</sub> 10-60cm	6.9	4.7	5.5	4.7	5.5	5.1		6.9	4.7	5.5	5.1	4.7	4.9			
	Previous rotation	Pasture	Canola	Lupins	Canola	Lupins	Canola		Pasture	Canola	Lupins	Canola	Canola	Canola			
	Variety	t/ha	%	t/ha	%	t/ha	%	t/ha	%	t/ha	%	t/ha	%	t/ha	%	t/ha	%
AH	Bonnie Rock <sup>(b)</sup>	3.68	100	5.44	94	2.76	96	3.96	96	5.37	98	3.64	78	5.66	89	4.89	89
	Cobra <sup>(b)</sup>	4.00	109	6.68	115	3.12	109	4.60	112	5.85	107	4.99	107	7.14	112	5.99	109
	Emu Rock <sup>(b)</sup>	4.15	113	5.72	99	2.44	85	4.10	100	5.52	101	3.34	72	5.90	93	4.92	89
	Mace <sup>(b)</sup>	3.67	100	5.79	100	2.87	100	4.11	100	5.48	100	4.65	100	6.37	100	5.50	100
	Yitpi <sup>(b)</sup>	4.12	112	5.81	100	2.83	99	4.25	103	4.53	83	4.46	96	6.44	101	5.14	94
	Corack <sup>(b)</sup>	4.23	115	5.83	101	3.06	107	4.37	106	5.01	91	4.32	93	5.97	94	5.10	93
APW	Envoy <sup>(b)</sup>			5.68	98					4.88	89	4.00	86	5.69	89	4.86	88
	Espada <sup>(b)</sup>	3.74	102	5.85	101	2.85	99	4.15	101	5.04	92	4.17	90	6.19	97	5.13	93
	Estoc <sup>(b)</sup>			5.75	99					4.83	88	4.59	99	6.39	100	5.27	96
	Harper <sup>(b)</sup>	3.99	109	6.00	104	2.94	102	4.31	105	4.81	88	4.62	99	6.44	101	5.29	96
	Magenta <sup>(b)</sup>	4.10	112	6.01	104	3.20	111	4.44	108	5.16	94	4.97	107	6.56	103	5.56	101
	Scout <sup>(b)</sup>	4.03	110	6.59	114	2.77	97	4.46	109	4.71	86	4.53	97	6.64	104	5.29	96
TBC	Westonia	3.72	101	5.98	103	2.86	100	4.19	102	5.86	107	4.07	88	6.17	97	5.37	98
	Wyalkatchem <sup>(b)</sup>	3.72	101	5.97	103	3.06	107	4.25	103	5.09	93	4.67	100	5.99	94	5.25	95
	Trojan <sup>(b)</sup>			6.29	109					5.22	95	4.33	93	6.78	106	5.44	99
	Grenade CL Plus <sup>(b)</sup>	3.31	90	5.38	93	2.43	85	3.71	90	4.31	79	4.33	93	6.01	94	4.88	89
	Justica CL Plus <sup>(b)</sup>	3.70	101	5.43	94	2.59	90	3.91	95	4.72	86	4.43	95	5.93	93	5.03	91
	Calingiri	3.51	96	5.62	97	2.75	96	3.96	96	4.77	87	5.25	113	6.56	103	5.53	100
ASWN	Fortune <sup>(b)</sup>	3.67	100	5.81	100	2.70	94	4.06	99	4.91	90	5.11	110	6.42	101	5.48	100
	Yandanooka <sup>(b)</sup>	3.76	102	5.32	92	2.12	74	3.73	91	4.55	83	4.75	102	5.31	83	4.87	89
	Kunjin <sup>(b)</sup>	3.84	105	5.79	100	2.63	92	4.09	99	5.31	97	4.80	103	6.68	105	5.60	102
	Wedin <sup>(b)</sup>	3.43	93	5.90	102	2.85	99	4.06	99	5.00	91	4.74	102	6.73	106	5.49	100
	Isd (t/ha)	0.32		0.35		0.49				0.46		0.72		0.43			
	CV (%)	5.00		3.60		10.90				5.20		9.60		3.90			

\*: Trial had high level of rhizoctonia damage so interpret results with caution and make variety comparison using multiple trials from the region. #: Trial compromised by high levels of brome grass and ryegrass so interpret results with caution and make variety comparisons using multiple trials. Key for soil texture: S = sand, SL = sandy loam, L = loam, LC = loamy loam, L = loam, LC = loamy clay and C = clay. TBC= Still to be classified in WA.

Table 11 Adjusted grain yield results (t/ha and % of Mace<sup>(b)</sup>) of NVT trials in Agzone 5 in the Great Southern and Lakes Region, 2013

Region		Agzone 5									
Grade	Location	Jerramungup		Lake Grace		Hyden		Mt Madden		Agzone 5 AVE	
		t/ha	%	t/ha	%	t/ha	%	t/ha	%	t/ha	%
	Sowing Date	5-May		7-May		14-May		4-May			
	Soil texture	SL		SL		SL		SL			
	pH <sub>ca</sub> 0-10cm	5.2		4.7		4.6		5			
	pH <sub>ca</sub> 10-60cm	4.6		4.7		4.6		4.7			
	Previous rotation	Canola		Pasture		Lupins		Pasture			
	Variety	t/ha	%	t/ha	%	t/ha	%	t/ha	%	t/ha	%
AH	Bonnie Rock <sup>(b)</sup>	2.80	92	3.30	89	3.18	102	3.65	103	3.23	97
	Cobra <sup>(b)</sup>	2.97	98	3.74	101	3.47	111	3.28	93	3.37	101
	Emu Rock <sup>(b)</sup>	2.87	94	3.49	95	3.15	101	2.98	84	3.12	93
	Mace <sup>(b)</sup>	3.04	100	3.69	100	3.12	100	3.53	100	3.35	100
APW	Yipipi <sup>(b)</sup>	2.94	97	3.48	94	3.44	110	2.85	81	3.18	95
	Corack <sup>(b)</sup>	3.19	105	3.52	95	3.51	113	3.47	98	3.42	102
	Envoy <sup>(b)</sup>	2.94	97	3.57	97	3.04	97	2.97	84	3.13	94
	Espada <sup>(b)</sup>	2.84	93	3.48	94	3.28	105	2.91	82	3.13	93
TBC	Estoc <sup>(b)</sup>	3.11	102	3.63	98	3.16	101	3.07	87	3.24	97
	Harper <sup>(b)</sup>	3.04	100	3.54	96	3.32	106	3.28	93	3.30	99
	Magentia <sup>(b)</sup>	3.02	99	3.56	96	3.37	108	3.24	92	3.30	99
	Scout <sup>(b)</sup>	3.07	101	3.66	99	3.20	103	2.82	80	3.19	95
APW - Int	Westonia	2.86	94	3.51	95	3.33	107	3.47	98	3.29	98
	Wyalkatchem <sup>(b)</sup>	3.32	109	3.68	100	3.15	101	3.37	95	3.38	101
	Trojan <sup>(b)</sup>	3.15	104	3.64	99	3.62	116	3.37	95	3.45	103
	Grenade CL Plus <sup>(b)</sup>	2.72	89	3.32	90	2.95	95	3.23	92	3.06	91
ASWN	Justica CL Plus <sup>(b)</sup>	2.89	95	3.51	95	3.04	97	2.83	80	3.07	92
	Calingiri	2.91	96	3.52	95	3.12	100	3.12	88	3.17	95
	Fortune <sup>(b)</sup>	2.67	88	3.57	97	3.11	100	3.03	86	3.10	93
	Kunjin <sup>(b)</sup>	2.49	82	3.45	93	3.49	112	3.13	89	3.14	94
ASFT	Wedin <sup>(b)</sup>	3.05	100	3.70	100	3.24	104	3.38	96	3.34	100
	Isd (t/ha)	0.28		0.21		0.20		0.23			
	CV (%)	5.50		3.30		3.60		4.10			

Key for soil texture: S = sand, SL = sandy loam, L = loam, LC = loamy clay and C = clay. TBC = Still to be classified in WA.

Table 12 Time of sowing influence on grain yield (t/ha and % of Mace<sup>(b)</sup>) of wheat varieties at Katanning and time of sowing and grazing influence on grain yield (t/ha and grazed as a % of nil) of wheat varieties at South Newdegate and Kojonup in 2013

Grade	Variety	Katanning			South Newdegate			Kojonup					
		14-May	4-Jun	15-May	28-May	11-May	27-May						
		t/ha	%	t/ha	%	nil	grazed (% of nil)	nil	grazed (% of nil)	nil	grazed (% of nil)		
AH	Cobra <sup>(b)</sup>	4.12	95	4.68	115								
	Eagle Rock <sup>(b)</sup>	4.07	94	4.28	105								
	Emu Rock <sup>(b)</sup>	3.40	79	4.11	101								
	Mace <sup>(b)</sup>	4.33	100	4.06	100	2.77	94	2.69	84	3.39	94	3.04	87
	Yitpi <sup>(b)</sup>	4.07	94	3.67	90	2.48	96	2.37	77	3.29	88	3.28	83
APW	Corack <sup>(b)</sup>	4.32	100	4.25	105								
	Envoy <sup>(b)</sup>	3.79	87	4.09	101								
	Estoc <sup>(b)</sup>	4.09	95	4.05	100	2.52	104	2.37	82	3.02	94	3.44	82
	Harper <sup>(b)</sup>	4.32	100	3.16	78	2.47	98	2.53	77	3.79	88	3.85	80
	Magenta <sup>(b)</sup>	4.62	107	4.05	100	2.62	98	2.55	85	3.49	95	3.50	73
TBC	Wyalkatchem <sup>(b)</sup>	4.60	106	4.46	110	2.58	98	2.46	89	4.04	92	4.01	84
	Trojan <sup>(b)</sup>	4.92	114	4.39	108	2.72	96	2.64	79	4.11	87	3.67	87
ASWN	Calligiri	4.86	112	4.05	100					3.55	94	3.60	80
ASFT	Kunjiri <sup>(b)</sup>	3.23	75	4.06	100								
	Average within each TOS	4.19	Isd	4.10		2.52	98	2.47	82	3.57	90	3.51	82
		P-value (5%)				P-value (5%)	Isd			P-value (5%)	Isd		
	TOS	ns				0.001	0.04			ns			
	Variety	<.001	0.36			<.001	0.16			<.001	0.26		
	Grazing					<.001	0.03			<.001	0.44		
	TOS, Variety	<.001	0.54			ns				ns			
	TOS, Grazing					<.001	0.05			<.001	0.46		
	Variety, Grazing					ns				ns			
	TOS, Variety, Grazing					ns				ns			
	CV (%)		9.1			4.2				5.3			

TBC = Still to be classified in WA; Respective previous rotations = Canola, Pasture & Canola; Respective growing season rainfall (May-Oct) = 370mm, 210mm & 403mm. Grazed treatment: A simulated 2 week heavy grazing (using a whipper snipper to mow down to 3-5cm in height) at approximately 6 and 8 weeks after sowing, but before Z31.

## 2013 South Coastal Agricultural (SCR) Region Summary

In the 2013 growing season the southern sandplain enjoyed an early start, followed by above average winter rains. While parts of the sandplain suffered from waterlogging, the mallee was set up for one of the best years on record. Unlike previous years the spring rains were plentiful and the Esperance port zone achieved a record harvest.

Mace<sup>®</sup> is now the dominant variety of the SCR accounting for around 70% of the area sown to wheat.

With frequent rain and early sowing came higher levels of foliar disease than usual. The new strain of leaf rust to WA was detected in the area. This strain is virulent on varieties such as Mace<sup>®</sup> that rely on the leaf rust gene Lr13. The level of infection on Mace<sup>®</sup> varied across the port zone with the heaviest infection being in the Hyden area. Mace should now be regarded as being susceptible to leaf rust with the exact level of susceptibility yet to be determined. Routine fungicide applications for the control of yellow spot and the Septorias are likely to also control the new strain of leaf rust.

Harvest began very early and the region was largely spared any significant harvest rains. Most of the crop was harvested before rain arrived in mid-December and aided by drying winds, there were only isolated incidences of low Falling Numbers.

## Performance of wheat varieties in the NVT's

(Refer to Table 13)

The rapid adoption of Mace<sup>®</sup> has continued and it is likely to be the dominant variety in the immediate future as no major alternatives have been forthcoming from the NVTs. Now that Mace<sup>®</sup> is susceptible to leaf rust it is likely that the most popular wheat in the region will be 'Mace<sup>®</sup> plus fungicide'.

The other major variety in the region remains to be the later maturing Yitpi<sup>®</sup>. While viable alternatives to Mace<sup>®</sup> have yet to appear on the horizon there are two promising new varieties of later maturity that may be considered as possible replacements for Yitpi<sup>®</sup>. Both have improved rust resistance over Yitpi<sup>®</sup> namely APW classified Harper<sup>®</sup> and Trojan<sup>®</sup> which has APW classification in eastern Australia but is awaiting a final classification in WA (TBC). Unfortunately neither variety is a major improvement for resistance to yellow spot. Trojan<sup>®</sup> has proven to be higher yielding than Harper<sup>®</sup>, especially at the earlier sown and higher yielding sandplain sites Neridup and Munglinup.

Cobra<sup>®</sup> was not entered in the 2012 NVTs due to a seed mix-up. The 2013 trials confirmed data from other areas and years that had suggested that it is competitive with Mace<sup>®</sup> at yields over 2.5t/ha. Cobra<sup>®</sup>'s susceptibility to low falling number (FN) and poor performance in the drier mallee region mean that it is unlikely to be adopted on the south coast.

Other early maturing varieties released in recent years include Corack<sup>®</sup> which continues to be competitive with Mace<sup>®</sup> for yield but not falling number. The other newer variety, Emu Rock<sup>®</sup> once again yielded best in the lower rainfall mallee sites. The shorter growing season regions look to be Emu Rock<sup>®</sup>'s area of best adaptation as it is at risk of low falling number if rain occurs near harvest.

In 2012 yellow spot (YS) was observed to be at very high levels of infection in wheat trials that were sown into canola stubbles. Further observations in 2013 suggest that it makes a great deal of difference which crop preceded canola. The highest levels of YS were observed where wheat had preceded the canola crop and much lower levels when it was barley or pasture preceding canola. If YS is being carried over on stubble for more than one year then a variety with the highest level of resistance should be chosen for the wheat:canola:wheat rotation.

Table 13 Adjusted grain yield results (t/ha and % of Mace) of NVT trials in Agzones 5 and 6 in the South Coast Region, 2013

Region	Agzone 5					Agzone 6				
	Location	Scaddan	Salmon Gums	Agzone 5 Ave		South Strirlings	Munglinup	Nerrilup	Agzone 6 Ave	
Grade	Sowing Date	6-May L/SL	6-May SL	t/ha	%	19-May SL	7-May SSL	7-May SSL/SL	t/ha	%
	pH <sub>ca</sub> 0-10cm	7.3	5			4.8	4.5	4.9		
	pH <sub>ca</sub> 10-60cm	8.1	6.7			5.5	5.1	5.3		
	Previous rotation	Canola	Pasture			Canola	Canola	Canola		
	Variety	t/ha	%	t/ha	%	t/ha	%	t/ha	%	%
AH	Bonnie Rock <sup>o</sup>	3.75	90	2.55	85	4.50	3.88	2.78	95	95
	Cobra <sup>o</sup>	3.91	94	2.84	95	4.60	4.47	2.91	99	102
	Emu Rock <sup>o</sup>	3.93	94	3.27	109	3.87	3.70	2.28	78	84
	Mace <sup>o</sup>	4.18	100	3.00	100	4.62	4.14	2.94	100	100
APW	Yitpi <sup>o</sup>	3.82	91	2.40	80	3.97	3.82	2.58	88	89
	Corack <sup>o</sup>	4.25	102	3.02	101	4.18	4.09	3.26	111	99
	Envy <sup>o</sup>	4.02	96	2.82	94	4.44	4.25	2.99	102	100
	Espada <sup>o</sup>	3.93	94	2.64	88	4.14	3.81	2.60	88	90
	Estoc <sup>o</sup>	3.61	86	2.75	92	4.13	4.20	2.43	83	92
	Harper <sup>o</sup>	3.89	93	2.39	80	3.69	3.81	2.85	97	88
	Magenta <sup>o</sup>	3.71	89	2.62	87	4.44	4.43	3.03	103	102
	Scout <sup>o</sup>	4.06	97	2.75	92	4.49	4.12	2.95	100	99
	Westonia	3.90	94	2.70	91	4.50	3.80	3.00	103	97
	Wyalkatchem <sup>o</sup>	4.00	96	2.71	90	4.51	4.15	3.09	105	100
TBC	Trojan <sup>o</sup>	4.12	99	2.83	94	4.29	4.38	3.19	109	101
APW-Imi	Grenade CL Plus <sup>o</sup>	3.32	79	2.39	80	4.28	3.52	2.41	82	87
	Justica CL Plus <sup>o</sup>	3.63	87	2.61	87	4.30	4.08	2.66	90	94
ASWN	Calligiri	3.52	84	2.22	74	4.09	4.36	2.88	98	97
	Fortune <sup>o</sup>	3.36	80	2.39	80	4.22	3.91	2.70	92	93
ASFT	Kunjin <sup>o</sup>	3.95	94	2.90	97	4.22	3.98	2.91	99	95
	Wedim <sup>o</sup>	3.97	95	2.37	79	4.36	4.20	2.93	100	98
	Isd (t/ha)	0.33		0.19		0.38	0.35	0.23		
	CV (%)	5.08		3.97		5.13	4.76	4.57		

TBC= Still to be classified in WA

Table 14 Date of flowering (50%) for 22 wheat varieties from different sowing dates at four locations in WA in 2013

Grade	Variety	Geraldton				Northam				Katanning				Esperance			
		26-Apr	15-May	31-May	21-Jun	26-Apr	15-May	31-May	21-Jun	26-Apr	15-May	31-May	21-Jun	26-Apr	13-May	30-May	16-Jun
HA	Cobra <sup>o</sup>	21-Jul	7-Aug	22-Aug	11-Sep	29-Jul	22-Aug	6-Sep	22-Sep	21-Aug	5-Sep	19-Sep	3-Oct	17-Aug	31-Aug	13-Sep	20-Sep
	Emu Rock <sup>o</sup>	1-Jul	23-Jul	15-Aug	2-Sep	21-Jul	14-Aug	3-Sep	22-Sep	10-Aug	3-Sep	24-Sep	2-Oct	11-Aug	28-Aug	10-Sep	18-Sep
	King Rock <sup>o</sup>	9-Jul	1-Aug	21-Aug	1-Sep	25-Jul	17-Aug	7-Sep	18-Sep	18-Aug	3-Sep	19-Sep	2-Oct				
	Mace <sup>o</sup>	25-Jul	4-Aug	24-Aug	8-Sep	4-Aug	27-Aug	7-Sep	22-Sep	26-Aug	9-Sep	24-Sep	4-Oct	18-Aug	1-Sep		
	Yitpi <sup>o</sup>	4-Aug	23-Aug	12-Sep	28-Sep	13-Aug	1-Sep	19-Sep	6-Oct	5-Sep	22-Sep	6-Oct	16-Oct	31-Aug	13-Sep	26-Sep	6-Oct
	Corack <sup>o</sup>	18-Jul	6-Aug	22-Aug	5-Sep	5-Aug	21-Aug	8-Sep	22-Sep	20-Aug	8-Sep	22-Sep	3-Oct	16-Aug	31-Aug	13-Sep	20-Sep
	Envoy <sup>o</sup>	25-Jul	9-Aug	26-Aug	14-Sep	10-Aug	25-Aug	11-Sep	28-Sep	24-Aug	10-Sep	24-Sep	5-Oct				
	Estoc <sup>o</sup>	1-Aug	14-Aug	31-Aug	19-Sep	13-Aug	30-Aug	15-Sep	6-Oct	31-Aug	13-Sep	29-Sep	10-Oct	30-Aug	9-Sep	25-Sep	30-Sep
	Grenade CL Plus <sup>o</sup>	25-Jul	3-Aug	26-Aug	12-Sep	5-Aug	24-Aug	11-Sep	26-Sep	21-Aug	10-Sep	23-Sep	5-Oct				
	Justica CL Plus <sup>o</sup>	27-Jul	8-Aug	28-Aug	22-Sep	4-Aug	28-Aug	19-Sep	29-Sep	1-Sep	15-Sep	3-Oct	9-Oct				
APW	Harper <sup>o</sup>	4-Aug	16-Aug	2-Sep	21-Sep	11-Aug	1-Sep	15-Sep	3-Oct	1-Sep	19-Sep	4-Oct	11-Oct	30-Aug	9-Sep	25-Sep	2-Oct
	Magenta <sup>o</sup>	3-Aug	14-Aug	31-Aug	12-Sep	14-Aug	28-Aug	12-Sep	28-Sep	1-Sep	19-Sep	2-Oct	9-Oct	28-Aug	8-Sep	24-Sep	28-Sep
	Scout <sup>o</sup>	25-Jul	9-Aug	26-Aug	8-Sep	6-Aug	25-Aug	7-Sep	24-Sep	24-Aug	12-Sep	25-Sep	5-Oct	22-Aug	2-Sep	17-Sep	24-Sep
	Westonia	7-Jul	30-Jul	22-Aug	2-Sep	21-Jul	22-Aug	9-Sep	22-Sep	7-Aug	30-Aug	15-Sep	2-Oct	12-Aug	29-Aug	12-Sep	20-Sep
	Wyalkatchem <sup>o</sup>	18-Jul	8-Aug	23-Aug	11-Sep	27-Jul	25-Aug	10-Sep	27-Sep	29-Aug	10-Sep	24-Sep	8-Oct	14-Aug	31-Aug	14-Sep	22-Sep
	Wedgetail <sup>o</sup>	10-Sep	18-Sep	28-Sep	10-Oct	16-Sep	21-Sep	29-Sep	11-Oct	29-Sep	4-Oct	14-Oct	24-Oct	18-Sep	25-Sep	3-Oct	9-Oct
	Zippy <sup>o</sup>	1-Jul	20-Jul	16-Aug	1-Sep	14-Jul	11-Aug	2-Sep	15-Sep	8-Aug	30-Aug	13-Sep	27-Sep	1-Aug	22-Aug	9-Sep	14-Sep
	Trojan <sup>o</sup>	29-Jul	14-Aug	1-Sep	15-Sep	11-Aug	31-Aug	17-Sep	29-Sep	31-Aug	12-Sep	29-Sep	9-Oct	25-Aug	6-Sep	21-Sep	28-Sep
	Calligiri	28-Jul	10-Aug	26-Aug	12-Sep	13-Aug	31-Aug	14-Sep	28-Sep	5-Sep	19-Sep	29-Sep	5-Oct	23-Aug	9-Sep	23-Sep	28-Sep
	Fortune <sup>o</sup>	29-Jul	15-Aug	31-Aug	21-Sep	10-Aug	31-Aug	11-Sep	26-Sep	31-Aug	15-Sep	30-Sep	7-Oct				
ASFT	EGA2248 <sup>o</sup>	21-Jul	29-Jul	22-Aug	12-Sep	7-Aug	23-Aug	12-Sep	24-Sep	27-Aug	4-Sep	24-Sep	4-Oct				
	Wedm <sup>o</sup>	3-Aug	10-Aug	1-Sep	19-Sep	11-Aug	4-Sep	19-Sep	29-Sep	5-Sep	19-Sep	2-Oct	15-Oct				

Flowering dates in green fall within estimated flowering date for the highest yield at the locations (Geraldton: 11-31 Aug, Northam: 5-25 Sep, Katanning: 17 Sep - 7 Oct, Esperance: 7-27 Sep), amber represents + or - 7 days outside the estimated window, while red represents sowing times where the variety flowers more than 7 days outside the estimated flowering window. TBC=Still to be classified in WA



## Herbicide tolerance of wheat varieties

The herbicide tolerance trials conducted over the last 14 years in WA indicate that some wheat varieties are more susceptible to damage from certain herbicides than others (Tables 15 and 16). The variation in tolerance may be due to differences in morphological or physiological characters and/or internal ear development stages among the varieties. The level of tolerance amongst varieties varies with the rate of herbicide, the environmental conditions when the herbicide is applied, and the stage of the crop growth. Seasonal variability makes it essential to test herbicide and variety interaction over several seasons and locations. The risk of crop damage from a herbicide should be balanced against the potential yield loss from both the weed competition and the number of weed seeds returning to the soil seed bank. Small yield reductions due to herbicide damage in sensitive varieties may not be easily detected at the paddock level, but over larger areas can be of great economic importance.

The herbicide tolerance of ten commonly grown wheat varieties in WA (Table 15) and nine recently released varieties (Table 16) are summarised using the following symbols. The herbicide and variety interactions are based on the yield response across herbicide crop tolerance trials conducted in WA from 1999–2013.

– Not tested or insufficient data

√ no significant yield reductions at the label recommended rates in (Z) trials.

N (w/z) narrow margin, significant yield reductions at higher than the label recommended rate, but not at the label recommended rate. Significant event occurring in w trials out of Z trials conducted. Eg (2/5) = tested in 5 trials, 2 trials returning with a significant yield reduction.

x% (1/z) yield reduction (warning) significant yield reduction at recommended rate in 1 trial only out of z trials conducted.

x-y% (w/z) yield reductions (warning) significant yield reductions at recommended rate in w trials out of z trials conducted.

A narrow crop safety margin implies that when spraying herbicide at the label rate under less than optimal conditions, herbicide damage and yield loss may occur. For example, when:

- overlapping herbicide
- spraying under wet conditions (for soil active and residual herbicides)
- there are stressed plants due to abiotic/biotic factors.

### Herbicide tolerance of recent varieties

Since 2009, NVT advanced lines/varieties have been tested for herbicide tolerance in small plot (1.6m x 1.5m) screening trials at Katanning. The herbicides Boxer® Gold, Diuron + Dual®, Sakura®, Triflur® X, Glean®, Hoegrass® + Achieve®, Jaguar®, Affinity® + MCPA (Amine), Ally®, Diuron + MCPA (Amine), Tigrex® and 2 4-D LV ester 680 (xtra) are tested at higher than label rates. The majority of these herbicides were selected based upon their consistent damage (significant yield reduction) to wheat varieties in the previous trials. Boxer® Gold and Sakura® were included in the trials due to an expected rapid uptake of these herbicides for better ryegrass management. Any variety x herbicide/herbicides

combination(s) that registered significant yield reduction in the screening trials, are being tested in larger plot (10m x 1m) advanced trials. The testing is done at label and higher than label rates for at least two years to validate the results and to minimise the seasonal influences on herbicide tolerance. The results from the advanced trials on the new varieties are presented in the Table 16. Velocity® results on Scout are from another trial conducted at Katanning during 2013.

### A. Important comments regarding safe use of herbicides

Sakura® 850 WG @ 118 g/ha is registered as a pre-emergent herbicide on bread wheat (not durum wheat) for the control of annual ryegrass, barley grass, silver grass, toad rush and annual phalaris. Sakura® could cause crop damage in situations which lead to an increased concentration of this herbicide in the planting row, or movement of the herbicide to the depth of the crop seed, which is similar to other soil active residual pre-emergent herbicides. Examples include the movement of herbicide treated soil into the seeding furrows due to wind or heavy rainfall soon after sowing, resulting in higher concentration of herbicide in the crop row. Another example is heavy rainfall between application and crop emergence on soils which have high potential for leaching, which may result in movement of the herbicide into the seed zone. For detail please see the Sakura® label.

The trial results (Table 15) indicate Sakura® at higher than the label rate caused statistically significant yield loss across the majority of varieties at Mullewa during 2011 and 2012 on sandy loam to loamy soils. A significant yield loss was registered even at label rate in 4 out of 6 varieties tested during 2012 at Mullewa. This could be due to a higher concentration of the herbicide in the seeding furrow or leaching into the seed/root zone as a result of a 26mm and 29mm rainfall event within a week of sowing during 2011 and 2012, and a single rainfall event of 34mm within a month during 2011. Another pre-emergent herbicide, Boxer® Gold, also responded similarly in the trials. When looking at occasional yield effects, it is important to remember that using grass herbicides in cereal crops often causes some crop effect, but the herbicides are being used to control weeds and the net return is a yield increase from weed control after any crop effect.

When using trifluralin, Yield®, Stomp® and Avadex®, ensure sown seed is placed below the herbicide treated soil band; otherwise severe root retardation may result. Surface crusting may exacerbate emergence problems. Old seed with reduced vigour, varieties with short coleoptiles, and seed dressings that reduce coleoptile length should be avoided. If sowing with knife points, and using higher label rates, ensure that treated soil does not get thrown, blown or washed into the furrows.

Diuron 1.0L + Dual® (Metolachlor 720g/L) 0.5L/ha have been reported to cause more crop damage on lighter than heavier soil types. If using knife point and press wheels to sow the crop, apply this mixture pre plant only (0–7 days) as knife points leave open furrows/slots. Crop damage can result if herbicide is washed into the furrows. If using a 'Full Cut' seeding system, that leaves a relatively smooth surface, this mixture can be applied post plant preemergent within 3–4 days of planting.

Metribuzin 150g a.i./ha is registered as a preemergent herbicide on Eagle Rock<sup>®</sup> wheat. To achieve good control of annual ryegrass and barley grass, Treflan<sup>®</sup> 480 @ 1.0L/ha can also be mixed with the recommended rate of metribuzin. The trial work has indicated that a two way mix of metribuzin 150g a.i./ha (e.g. Lexone<sup>®</sup> 200g/ha) with Diuron 1.0L or Stomp<sup>®</sup> 330E 1.0L or three way mix with Diuron 1.0L and Dual<sup>®</sup> Gold 250mL/ha was safe on this variety. Any weed escapes, especially brome grass after metribuzin use could possibly be controlled/suppressed, by application of Monza<sup>®</sup> @ 25g/ha at 2–3 leaf or Atlantis<sup>®</sup> @ 330mL/ha at 3–4 leaf stage of the crop. Do not use metribuzin (alone or in mixture with other herbicides) on the other wheat varieties (e.g. Carnamah), as large yield reductions have been recorded in the trials. Moreover metribuzin at 150g a.i./ha is registered for use on Eagle Rock<sup>®</sup> and Blade only.

Where marginal zinc and copper deficiency conditions exist, Glean<sup>®</sup> and Logran<sup>®</sup> may aggravate such deficiencies.

## B. Safe timings for phenoxy herbicides' application

MCPA, 2,4-D and dicamba are the main phenoxy herbicides used in wheat. The timing of their application is much more critical than for other herbicides. These herbicides often produce morphological abnormalities in both the vegetative parts and ears of wheat plants.

Wheat tolerance to these herbicides depends on the stage of ear development. Wheat is most sensitive to these herbicides at the double ridge/floral initiation stage of ear development. At this stage, cells change from producing leaves and begin to form the ear. The embryonic ear continues to form until the 'terminal spikelet' stage is reached.

Spraying advice is based on leaf and tiller development, but not all varieties have the same correlation between leaf/tiller and ear development. Thus different varieties become safe to phenoxy spray at slightly different growth stages. Long season varieties take longer to reach the safe stage.

To use higher rates of MCPA amine (2.0L/ha) and 2,4-D amine 625 (1.3L/ha) in Amery, Axe<sup>®</sup>, Bonnie Rock<sup>®</sup>, Cobra<sup>®</sup>, Emu Rock<sup>®</sup>, Espada<sup>®</sup>, King Rock<sup>®</sup>, Kunjin<sup>®</sup>, Mace<sup>®</sup>, Tincurrin, Westonia, Wyalkatchem<sup>®</sup>, and Zippy<sup>®</sup> apply these herbicides at Z15-Z16 (5–6 leaves on the main stem); in Brookton, Bumper<sup>®</sup>, Camm, Carnamah, EGA Eagle Rock<sup>®</sup>, Fortune<sup>®</sup>, Magenta<sup>®</sup>, Scout<sup>®</sup>, Stiletto, Yandanooka<sup>®</sup> and Yitpi<sup>®</sup> at Z16Z17, and in Endure<sup>®</sup>, Calingiri and Spear at Z17-Z18. At these stages floral initiation will be completed in the above varieties.

Do not apply these phenoxy herbicides between flag leaf emergence and the soft dough stage on any variety. Generally MCPA amine is safer than 2,4-D amine especially on later developing varieties.

Dicamba (and mixtures with 2,4-D or MCPA) should not be applied after Zadoks 30 (pseudo-stem elongation, but first node not yet above soil surface).

The previous trial results indicate that caution should be used if applying phenoxy herbicides in dry seasons when there is moisture stress. Brookton and Calingiri were found to be more sensitive to phenoxy herbicides than the other varieties under moisture stress conditions.

As several wild radish populations from the Northern Agricultural Region have been confirmed resistant to phenoxy herbicides, rotate the phenoxy herbicides with other herbicides or apply as a mix with other herbicides at full rates to keep these herbicides working.

## C. Waterlogging and crop safety

A number of products, including Group A and B herbicides are tolerated by wheat because they are metabolised within the seedling. If a seedling's growth is retarded by waterlogging, cold or any other factor, its metabolism is reduced, and toxic levels of herbicide can accumulate within the plant. There were many cases of such damage in 1999.

There were also many examples of trifluralin reducing emergence when the paddocks were waterlogged. It is suspected that this was due to increased uptake by the coleoptile from the wet soil. If there is any chance of extreme waterlogging just after seeding, crop damage is more likely, and farmers should consider using safer products, or spraying post-emergence.

Note: Herbicide tolerance data was provided by Harmohinder Dhammu, DAFWA Northam. More information can be found online at <http://www.nvtonline.com.au> or contact Dr Dhammu (08) 9690 2217 or [harmohinder.dhammu@agric.wa.gov.au](mailto:harmohinder.dhammu@agric.wa.gov.au).

The State of Western Australia, the Minister for Agriculture, the Chief Executive Officer of the Department of Agriculture and Food and their respective officers, employees and agents:

- a) Do not endorse or recommend any individual specified product or any manufacturer of a specified product. Brand, trade and proprietary names have been used solely for the purpose of assisting users of this publication to identify products. Alternative manufacturers' products may perform as well or better than those specifically referred to.
- b) Do not endorse the use of herbicides above the registered rate, off-label use of herbicides or off-label tank mixes. Crop tolerance and yield responses to herbicides are strongly influenced by seasonal conditions. Always adhere to label recommendations.

Table 15 Herbicide tolerance of wheat varieties (1999-2013) commonly grown in Western Australia

Varieties >>>>		Artno		Calligiri		Carnamah		Bonnie Rock		Mace		Magenta		Stiletto		Westonia		Wyalkatchem		Yitpi	
Year of testing and trial sites >>>		99-01	99-01, 10-13	99-03, 06,10-12	02-04, 06,10-13	09(2), 12(2),13	08, 09(2), 12(2), 13	00, 10-12	99-03, 2013	01-06, 08-13	00, 10-13	00, 10-12	00, 10-12	00, 10-12	00, 10-12	00, 10-12	00, 10-12	00, 10-12	00, 10-12	00, 10-12	00, 10-13
Herbicides/ha	Timing	ADEF	ACDEF	ABCDEF	CDE	CE	CE	BCE	ABDEF	BCDE	BCE	CE	CE	BCE	ABDEF	BCDE	BCDE	BCDE	BCE	BCE	
Avadex® BW 2L (Tri-allele)	IBS	√(6)	√(6)	√(12)	√(5)	-	-	√(1)	-	√(8)	√(1)	-	-	√(1)	31 (1/10)	√(8)	√(1)	√(1)	√(1)	√(1)	
Boxer® Gold 2.5L (s-Metolachlor + Prosulfocarb)	IBS	-	4 (1/4)	4 (1/5)	N (2/3)	10 (1/5)	N (1/6)	7 (1/3)	√(1)	N (2/5)	7 (1/3)	-	-	√(1)	√(1)	N (2/5)	N (1/3)	N (1/3)	N (1/3)	N (1/3)	
Dual® Gold 0.25L (s-Metolachlor)	IBS	-	-	-	-	√(2)	√(3)	-	-	√(3)	-	-	-	-	-	√(3)	-	√(3)	-	-	
Diuron 1L+ Dual® Gold 0.25L (Diuron + s-Metolachlor)	IBS/IPP	√(5)	√(5)	17 (1/10)	√(2)	√(2)	√(3)	16 (1/1)	√(8)	18 (1/8)	16 (1/1)	√(3)	√(3)	16 (1/1)	√(8)	18 (1/8)	18 (1/8)	18 (1/8)	√(1)	√(1)	
Glean® 12.5g (Chlorsulfuron)	IBS	37 (1/6)	12-25 (2/6)	√(12)	√(3)	-	-	√(1)	√(10)	√(6)	√(1)	-	-	√(1)	√(10)	√(6)	√(6)	√(6)	√(1)	√(1)	
Glean® 20g (Chlorsulfuron)	IBS	√(2)	√(2)	√(2)	√(2)	-	-	-	√(2)	√(5)	-	-	-	-	√(2)	√(5)	√(5)	√(5)	-	-	
Logran® 35g (Triasulfuron)	IBS	√(7)	√(7)	√(13)	√(3)	-	-	√(1)	√(11)	√(6)	√(1)	-	-	√(1)	√(11)	√(6)	√(6)	√(6)	√(1)	√(1)	
Logran® B Power 50g (Triasulfuron + Butafenacil)	IBS	-	-	√(3)	√(5)	√(2)	√(3)	-	√(2)	√(11)	-	-	-	√(2)	√(2)	√(11)	√(11)	√(11)	-	-	
Sakura® 850 WG 118g (Pyoxasulfone)	IBS	-	8-15 (3/5)	N (1/4)	11 (1/4)	16 (1/3)	16 (1/3)	N (1/4)	√(1)	N (1/5)	N (1/4)	16 (1/3)	16 (1/3)	N (1/4)	√(1)	N (1/5)	N (1/5)	N (1/5)	N (1/4)	N (1/4)	
Stomp® 330 1.8L (Pendimethalin)	IBS	13 (1/7)	√(7)	36 (1/13)	√(5)	-	√(1)	√(1)	21-24 (2/11)	√(12)	√(1)	-	-	√(1)	√(10)	√(12)	√(12)	√(12)	√(1)	√(1)	
Treflan® 1L (Trifluralin)	IBS	√(7)	√(7)	√(12)	√(2)	-	-	√(1)	√(10)	√(5)	√(1)	-	-	√(1)	√(10)	√(5)	√(5)	√(5)	√(1)	√(1)	
Triflur® X 2L (Trifluralin)	IBS	-	-	36 (1/1)	√(3)	-	-	-	√(1)	√(6)	-	-	-	√(1)	√(1)	√(6)	√(6)	√(6)	-	-	
Triflur® X 3L (Trifluralin)	IBS	-	-	-	-	12 (1/2)	√(3)	-	-	√(3)	-	-	-	-	-	√(3)	√(3)	√(3)	-	-	
Yield® 250 EC 2L (Oryzalin + Trifluralin)	IBS	√(7)	√(7)	12 (1/10)	-	-	-	√(1)	√(9)	√(3)	√(1)	-	-	√(1)	√(9)	√(3)	√(3)	√(3)	√(1)	√(1)	
Diuron 1L + Glean® 15g (Diuron + Chlorsulfuron)	IPP	√(5)	√(5)	√(6)	-	-	-	15 (1/1)	14 (1/6)	-	15 (1/1)	-	-	√(1)	√(10)	√(6)	√(6)	√(6)	√(1)	√(1)	
Achieve® 250g (Traikoxidim)	Z12-Z14	√(6)	√(6)	√(12)	√(3)	-	-	√(3)	√(10)	√(6)	√(3)	-	-	√(1)	√(10)	√(6)	√(6)	√(6)	√(1)	√(1)	
Achieve® 380g (Traikoxidim)	Z12-Z14	√(1)	√(1)	√(1)	√(2)	13 (1/2)	√(3)	-	√(1)	√(8)	-	-	-	-	√(1)	√(8)	√(8)	√(8)	-	-	
Axial® 300mL (Phoxadin)	Z12-Z13	-	-	-	-	-	√(1)	-	-	√(4)	-	-	-	-	-	√(4)	√(4)	√(4)	-	-	
Cheetah® Gold 1L (Diclofop + Sethoxydim + Fenoxaprop)	Z12-Z13	-	-	-	-	√(2)	7 (1/3)	-	-	√(5)	-	-	-	-	-	√(5)	√(5)	√(5)	-	-	
Decision® 1.0L (Diclofop + Sethoxydim)	Z12-Z13	-	-	√(3)	√(5)	-	-	-	√(2)	√(6)	-	-	-	-	√(2)	√(6)	√(6)	√(6)	-	-	
Eclipse® 10g (Metasulam)	Z12-Z13	√(4)	12 (1/4)	√(7)	-	-	-	√(1)	√(6)	√(3)	√(1)	-	-	√(1)	√(6)	√(3)	√(3)	√(3)	√(1)	√(1)	
Glean® 20g (Chlorsulfuron)	Z12-Z13	-	-	-	-	√(2)	√(3)	-	-	6 (1/3)	-	-	-	-	-	6 (1/3)	6 (1/3)	6 (1/3)	-	-	
Hoegrass® 200mL + Achieve® 200g (Diclofop-methyl + Traikoxidim)	Z12-Z13	√(1)	√(1)	10 (1/6)	√(5)	√(2)	√(3)	-	√(4)	19-30 (2/14)	-	-	-	-	√(4)	19-30 (2/14)	19-30 (2/14)	19-30 (2/14)	-	-	
Hoegrass® 375 1.5L (Diclofop-methyl)	Z12-Z13	√(2)	√(2)	√(2)	-	-	-	-	√(2)	-	-	-	-	-	√(2)	-	-	-	-	-	
Hoegrass® 375 2L (Diclofop-methyl)	Z12-Z13	-	-	√(2)	√(4)	-	√(1)	-	√(1)	20 (1/8)	-	-	-	√(1)	√(1)	20 (1/8)	20 (1/8)	20 (1/8)	-	-	
Jaguar® 1.0L (Bromoxynil + Diflufenican)	Z12-Z13	√(6)	15-19 (2/6)	√(12)	√(5)	√(2)	√(3)	√(1)	√(10)	√(14)	√(1)	√(3)	√(3)	√(1)	√(10)	√(14)	√(14)	√(14)	√(1)	√(1)	
Monza® 25g (Sulfosulfuron)	Z12-Z13	-	-	√(3)	√(5)	√(2)	√(3)	-	√(2)	6 (1/11)	-	-	-	√(2)	√(2)	6 (1/11)	6 (1/11)	6 (1/11)	-	-	
Topik® 240 EC 0.140L (Clodinafop)	Z12-Z13	√(1)	√(1)	√(1)	-	-	-	-	√(1)	-	-	-	-	-	√(1)	-	-	-	-	-	
Topik® 240 EC 0.210L (Clodinafop)	Z12-Z13	-	-	-	√(2)	-	-	-	-	√(2)	-	-	-	-	-	√(2)	√(2)	√(2)	-	-	
Tristar® 1.4L (Diclofop + Fenoxaprop)	Z12-Z13	√(1)	√(1)	√(1)	-	-	-	-	√(1)	-	-	-	-	-	√(1)	-	-	-	-	-	

Table 15 (cont) Herbicide tolerance of wheat varieties (1999-2013) commonly grown in Western Australia

Varieties >>>>		Arrno	Calligiri	Carnamah	Bonnie Rock <sup>®</sup>	Mace <sup>®</sup>	Magenta <sup>®</sup>	Stiletto	Westonia	Wyalkatchem <sup>®</sup>	Yitpi <sup>®</sup>
Year of testing and trial sites >>>>		99-01	99-01, 10-13	99-03, 06,10-12	02-04, 06,10-13	09 (2), 12 (2),13	08, 09 (2), 12 (2), 13	00, 10-12	99-03, 2013	01-06, 08-13	00, 10-13
Herbicides/ha	Timing	ADEF	ACDEF	ABCDEF	CDE	CE	CE	BCE	ABDEF	BCDE	BCE
Velocity <sup>®</sup> 0.670L (Bromoxynil + Pyrosulfotole)	Z12-Z15	-	25 (1/4)	√(2)	11 (1/3)	√(4)	8(1/4)	√(2)	9(1/1)	5-9 (2/6)	√(3)
Velocity <sup>®</sup> 0.670L + Ecpap <sup>®</sup> 0.2L + BS 1000 0.2% (Bromoxynil + Pyrosulfotole + Pyralufen-ethyl)	Z12-Z13	-	√(1)	√(1)	√(1)	√(1)	13 (1/1)	-	-	√(1)	-
Wildcat <sup>®</sup> 0.5L (Fenoxaprop-P-ethyl)	Z12-Z13	√(2)	√(2)	√(2)	-	-	-	-	√(2)	-	-
Affinity <sup>®</sup> 50g + MCPA 0.5L (Carfentrazone-ethyl + MCPA amine)	Z13-Z14	√(4)	9-15 (2/4)	√(10)	√(5)	√(2)	√(3)	√(1)	√(8)	22 (1/14)	√(1)
Affinity <sup>®</sup> Force 100mL+ MCPA 0.5L (Carfentrazone-ethyl + MCPA amine)	Z13-Z14	-	5(1/4)	√(4)	5 (1/4)	-	-	√(4)	-	9 (1/4)	√(4)
Aly 5g + MCPA LVE 0.5L + Lontrel <sup>®</sup> 750 SG 40g (Metsulfuron + MCPA + Clopyralid)	Z13-Z16	-	-	√(1)	√(1)	-	-	-	-	√(1)	-
Aly <sup>®</sup> 5g (Metsulfuron)	Z13-Z14	√(5)	11(1/5)	15 (1/11)	√(5)	-	-	√(1)	14-26 (3/9)	√(11)	√(1)
Aly <sup>®</sup> 7g (Metsulfuron)	Z13-Z14	√(1)	-	√(1)	-	11 (1/2)	√(3)	-	√(1)	8 (1/3)	-
Atlantis <sup>®</sup> 330mL (Mesosulfuron-methyl)	Z13-Z14	-	-	√(2)	√(4)	√(2)	√(3)	-	-	√(10)	-
Broadside <sup>®</sup> 1L (Bromoxynil + MCPA+Dicamba)	Z13-Z14	√(6)	√(6)	8-10 (2/12)	√(3)	-	√(1)	√(1)	√(10)	√(10)	√(1)
Broadside <sup>®</sup> 1.4L (Bromoxynil + MCPA+Dicamba)	Z13-Z14	-	-	-	√(2)	-	-	-	-	√(2)	-
Buctri <sup>®</sup> MA 1L (Bromoxynil + MCPA)	Z13-Z14	√(4)	9 (1/4)	√(7)	-	-	-	√(1)	12 (1/6)	√(3)	√(1)
Buctri <sup>®</sup> MA 1.4L (Bromoxynil + MCPA)	Z13-Z14	-	-	√(3)	√(5)	√(2)	√(3)	-	√(2)	6 (1/11)	-
Crusader <sup>®</sup> 0.5L (Pyroxysulam + Cloquintocet Metyl)	Z13-Z16	-	-	√(1)	√(1)	-	-	-	-	√(1)	-
Crusader <sup>®</sup> 0.5L+ Lontrel <sup>®</sup> 750 SG 120g (Pyroxysulam + Cloquintocet Metyl +Clopyralid)	Z13-Z16	-	-	N (1/1)	√(1)	-	-	-	-	N (1/1)	-
Crusader <sup>®</sup> 0.5L + MCPA LVE 0.350g (Pyroxysulam + Cloquintocet Metyl + MCPA LVE)	Z13-Z16	-	-	√(1)	√(1)	-	-	-	-	√(1)	-
Diuron 0.350L + MCPA 0.4L (Diuron +MCPA)	Z13-Z14	-	-	-	-	√(2)	√(3)	-	-	√(3)	-
Diuron 0.350L + MCPA 0.5L (Diuron +MCPA)	Z13-Z14	√(7)	16 (2/7)	√(10)	-	-	-	√(1)	√(9)	√(3)	√(1)
Diuron 0.5L + 2,4-D 0.25L (Diuron +2,4-D)	Z13-Z14	-	-	√(3)	√(5)	-	-	-	√(2)	√(5)	-
Eclipse <sup>®</sup> 5g + MCPA LVE 0.5L (Metosulam + MCPA)	Z13-Z14	-	-	-	√(2)	√(2)	√(3)	-	-	√(8)	-
Flight <sup>®</sup> EC 0.720L (Picolinafen + Bromoxynil + MCPA ester)	Z13-Z14	-	√(6)	18 (1/5)	√(5)	N (1/3)	√(3)	√(5)	√(1)	14 (1/6)	19 (1/5)
Glean <sup>®</sup> 3g + Aly <sup>®</sup> 3g + MCPA 0.3L (Chlorsulfuron + Metsulfuron +MCPA)	Z13-Z14	√(1)	√(1)	√(3)	-	-	-	-	√(2)	√(3)	-
Hussar <sup>®</sup> 200g (Iodosulfuron-methyl)	Z13-Z14	√(1)	√(1)	√(6)	√(5)	√(2)	√(3)	-	√(4)	√(14)	-
Hussar <sup>®</sup> 200g + Lontrel <sup>®</sup> 750 SG 120g (Iodosulfuron-methyl + Clopyralid)	Z13-Z16	-	-	√(1)	√(1)	-	-	-	-	√(1)	-
Lontrel <sup>®</sup> 300 0.3L (Clopyralid)	Z13-Z14	-	-	-	√(2)	-	-	-	-	√(2)	-

Table 15 (cont) Herbicide tolerance of wheat varieties (1999-2012) commonly grown in Western Australia.

Varieties >>>>		Arrno	Calligiri	Carnamah	Bonnie Rock <sup>®</sup>	Mace <sup>®</sup>	Magenta <sup>®</sup>	Stiletto	Westonia	Wyalkatchem <sup>®</sup>	Yitpi <sup>®</sup>
Year of testing and trial sites >>>>		99-01	99-01, 10-13	99-03, 06,10-12	02-04, 06,10-13	09 (2), 12 (2), 13	08, 09 (2), 12 (2), 13	00, 10-12	99-03, 2013	01-06, 08-13	00, 10-13
Herbicides/ha	Timing	ADEF	ACDEF	ABCDEF	CDE	CE	CE	BCE	ABDEF	BCDE	BCE
Mataiven <sup>®</sup> – L 3.0L (Flamprop-M-methyl)	Z13-Z14	√ (1)	√ (1)	√ (6)	√ (5)	–	–	–	√ (4)	√ (11)	–
Paragon <sup>®</sup> 0.375L (Picolinaten + MCPA)	Z13-Z14	–	–	–	√ (2)	–	–	–	–	√ (3)	–
Precept <sup>®</sup> 300 1L (Pyrasulfotole + MCPA Ester)	Z13-Z14	–	–	–	–	–	√ (1)	–	–	√ (1)	–
Tigrex <sup>®</sup> 0.75L (Diflufenican + MCPA)	Z13-Z16	–	–	N (1/1)	√ (1)	–	–	–	–	N (1/1)	–
Tigrex <sup>®</sup> 1.0L (Diflufenican + MCPA)	Z13-Z14	√ (7)	16 (1/7)	30 (1/13)	√ (5)	√ (2)	√ (3)	√ (1)	18 – 41 (2/11)	√ (14)	√ (1)
Torpedo <sup>®</sup> 0.1L (Florasulam + Clopyralid)	Z13-Z16	–	–	√ (1)	√ (1)	–	–	–	–	√ (2)	–
Torpedo <sup>®</sup> 0.1L + Bromoxynil M 0.5L (Florasulam + Clopyralid + Bromoxynil + MCPA)	Z13-Z16	–	–	√ (1)	√ (1)	–	–	–	–	√ (1)	–
Torpedo <sup>®</sup> 0.1L + MCPA LVE 0.5L (Florasulam + Clopyralid + MCPA LVE)	Z13-Z16	–	–	√ (1)	√ (1)	–	–	–	–	√ (1)	–
Torpedo <sup>®</sup> 0.1 + MCPA LVE 0.5L + Allyl <sup>®</sup> 5 g (Florasulam + Clopyralid + MCPA + Metsulfuron)	Z13-Z16	–	–	√ (1)	√ (1)	–	–	–	–	√ (1)	–
X-Pand <sup>®</sup> 125g (Isoxaben + Florasulam)	Z13-Z16	–	–	√ (1)	√ (1)	–	–	–	–	√ (1)	–
X-Pand <sup>®</sup> 125g + Bromoxynil M 0.35L (Isoxaben + Florasulam + Bromoxynil + MCPA)	Z13-Z16	–	–	√ (1)	√ (1)	–	–	–	–	√ (1)	–
X-Pand <sup>®</sup> 125g + MCPA LVE 0.35L (Isoxaben + Florasulam + MCPA LVE)	Z13-Z16	–	–	√ (1)	√ (1)	–	–	–	–	√ (1)	–
Paragon <sup>®</sup> 0.5L (Picolinaten + MCPA)	Z15+	–	–	–	–	√ (2)	√ (3)	–	–	√ (3)	–
MCPA (amine) 500 1.25L (MCPA)	Z15+	√ (1)	36 (1/1)	√ (5)	18 (1/3)	–	–	√ (1)	√ (4)	√ (3)	√ (1)
MCPA (amine) 500 2L (MCPA)	Z15+	–	–	–	√ (2)	√ (2)	√ (3)	–	–	√ (8)	–
2,4-D Amine 500 1L (2,4-D)	Z15+	√ (2)	√ (3)	√ (7)	√ (3)	–	–	√ (1)	11 – 35 (2/6)	√ (3)	√ (1)
2,4-D Amine 625 1.3L (2,4-D)	Z15+	–	–	–	√ (2)	√ (2)	√ (3)	–	–	√ (8)	–
2,4-D LV Ester 600 0.5L (2,4-D)	Z15+	√ (1)	√ (1)	39 (1/2)	–	–	–	√ (1)	41 (1/2)	–	√ (1)
2,4-D LV Ester 680 0.8L (2,4-D)	Z15+	–	√ (2)	–	–	√ (2)	√ (3)	–	–	√ (3)	–
2,4-D Ester 800 0.7L (2,4-D)	Z15+	–	–	12 (1/2)	√ (4)	–	–	–	√ (1)	16 (1/7)	–
Kamba <sup>®</sup> 500 0.28L (Dicamba)	Z15+	–	–	√ (3)	√ (3)	–	–	–	32 (1/2)	29 (1/3)	–
Kamba <sup>®</sup> 500 0.4L (Dicamba)	Z15+	–	–	–	–	√ (2)	√ (2)	–	–	√ (2)	–

The names in the parenthesis are the chemical names. IBS=incorporated by seeding/applied before the seeding of the crop, IPP=immediately post plant. A= Buntine, B= Esperance (Fleming gravelly sand, pH-4.5), C= Katanning (Duplex sandy, loamy sand, sandy loam, pH-4.3-5.2), D= Merredin (Clay loam/loam, pH-5.1-5.3), E= Mullewa (Sandy loam/red loam, pH-4.6-6.4) & F= Newdegate (Duplex sand over clay, pH-4.1).

**Note:** Higher than the label herbicide rates to work out crop safety margins (N) were used in some trials and/or some for products only.

Table 16 Herbicide tolerance of new wheat varieties conducted at Katanning between 2010 and 2013

Varieties >>>>		Cobra <sup>®</sup>	Corack <sup>®</sup>	Emu Rock <sup>®</sup>	Envoy <sup>®</sup>	Estoc <sup>®</sup>	Jusitca <sup>®</sup>	King Rock <sup>®</sup>	Kunjin <sup>®</sup>	Mace <sup>®</sup>	Magenta <sup>®</sup>	Scout <sup>®</sup>	Wyalkatchem <sup>®</sup>
Year of testing >>>	Timing	2013	2013	2012-13	2012-13	2012-13	2013	2010-11	2012-13	2013	2013	2013	2013
Herbicides/ha													
Sakura <sup>®</sup> 850 WG 118g (Pyroxasulfone)	IBS	-	-	-	-	√ (1)	-	-	30 (1/1)	-	-	√ (1)	-
Hoegrass <sup>®</sup> 200mL + Achieve <sup>®</sup> 200g (Diclofop-methyl + Traikoxydim)	Z12-Z13	-	-	-	√ (2)	-	-	-	-	-	-	-	-
Jaguar <sup>®</sup> 1.0L (Bromoxynil + Diflufenican)	Z12-Z13	√ (1)	-	-	-	-	-	-	-	-	-	-	-
Velocity <sup>®</sup> 0.670L (Bromoxynil + Pyrosulfotole)	Z12-Z13	-	-	-	-	-	-	-	-	-	-	√ (1)	-
Affinity <sup>®</sup> 60g + MCPA 0.5L (Carfentrazone-ethyl + MCPA amine)	Z13-Z14	√ (1)	-	-	√ (2)	-	-	-	N (1/2)	√ (1)	-	-	-
Ally <sup>®</sup> 7g (Metsulfuron)	Z13-Z14	-	-	-	-	N (1/2)	-	N (1/2)	-	-	-	-	-
Diuron 0.350L + MCPA 0.4L (Diuron +MCPA)	Z13-Z14	N (1/1)	N (1/1)	N (1/1)	N (1/1)	√ (1)	N (1/1)	-	N (1/1)	N (1/1)	-	-	-
Legacy <sup>®</sup> MA 1.0L (Diflufenican + MCPA)	Z13-Z14	-	-	-	√ (1)	√ (1)	-	-	-	√ (1)	√ (1)	√ (1)	√ (1)
Tigrex <sup>®</sup> 1.0L (Diflufenican + MCPA)	Z13-Z14	-	-	-	12 (1/1)	30 (1/1)	-	-	-	-	-	-	-
2,4-D LV Ester 680 0.8L (2,4-D)	Z15+	√ (1)	√ (1)	√ (2)	√ (1)	√ (1)	√ (1)	√ (1)	√ (1)	-	-	-	-

IBS=Incorporated by seeding/applied before the seeding of the crop. The trials were conducted at Great Southern Agricultural Research Institute (GSARI) Katanning on sandy loam to loamy sand soils with pH range of 4.3-5.1. The names in the parenthesis are the chemical names. Hoegrass<sup>®</sup> 375 200mL = Hoegrass<sup>®</sup> 500 150mL, Affinity<sup>®</sup> 400 DF 60g = Affinity<sup>®</sup> Force 100mL and Diuron 500 350mL = Diuron 900 194.5g. The total rainfall from May to November at Katanning was 211mm (2010), 419mm (2011), 299mm (2012) and 355mm (2013).

NOTE: For information on herbicide tolerance of Axe, Espada, Fortune, Gladius and Zippy wheat varieties, please see Wheat Variety Guide for WA 2013, page 30.  
[http://archive.agric.wa.gov.au/objtwr/imported\\_assets/content/amt/agb/wheat\\_variety\\_guide\\_2013.pdf](http://archive.agric.wa.gov.au/objtwr/imported_assets/content/amt/agb/wheat_variety_guide_2013.pdf)



**Table 17 Percentage of area sown to wheat varieties for the 2008/2009 to 2013/2014 seasons.**

Data from the CBH Group. Varieties with less than 0.06% of total crop area in 2013/2014 season are not included.

Variety	08/09 %	09/10 %	10/11 %	11/12 %	12/13 %	13/14 %
Mace <sup>Ⓛ</sup>		0.0	4.6	18.0	41.4	53.4
Calingiri	16.3	9.8	5.6	8.5	8.6	9.5
Wyalkatchem <sup>Ⓛ</sup>	29.5	32.7	29.7	22.7	14.5	7.7
Yitpi <sup>Ⓛ</sup>	8.5	11.0	10.7	9.8	7.0	6.3
Magenta <sup>Ⓛ</sup>		0.2	9.1	9.5	6.5	4.7
Stiletto	3.9	5.2	5.1	4.4	2.9	2.2
Cobra <sup>Ⓛ</sup>					0.2	1.7
Corack <sup>Ⓛ</sup>					0.1	1.6
Bonnie Rock <sup>Ⓛ</sup>	7.3	6.5	4.6	3.3	2.6	1.6
Westonia	3.7	4.2	3.8	3.2	2.6	1.5
Carnamah	8.1	6.9	5.0	3.6	1.9	1.3
Justica CL Plus <sup>Ⓛ</sup>				0.0	0.5	1.0
Arrino	5.4	3.4	1.9	2.4	1.4	0.8
Halberd	0.9	1.0	0.6	0.6	0.4	0.5
Spear	1.4	1.7	1.1	1.0	0.7	0.5
Eagle Rock <sup>Ⓛ</sup>	1.4	1.9	1.9	1.3	0.9	0.5
Tammarin Rock <sup>Ⓛ</sup>	0.6	1.0	0.7	0.8	0.6	0.5
Scout <sup>Ⓛ</sup>				0.2	0.4	0.5
Sapphire <sup>Ⓛ</sup>	2.5	3.0	2.7	1.3	0.9	0.4
Fortune <sup>Ⓛ</sup>		0.0	1.0	1.1	0.6	0.4
Clearfield STL <sup>Ⓛ</sup>	0.4	1.1	2.0	1.4	0.9	0.4
Emu Rock <sup>Ⓛ</sup>					0.0	0.3
King Rock <sup>Ⓛ</sup>			0.0	0.2	0.4	0.2
Espada <sup>Ⓛ</sup>	0.0	0.3	0.7	0.7	0.4	0.2
Machete	0.8	0.4	0.3	0.2	0.1	0.2
Frame	0.4	0.4	0.4	0.3	0.2	0.2
Binnu <sup>Ⓛ</sup>	0.5	0.7	0.4	0.3	0.2	0.2
Baxter	0.4	0.2	0.3	0.1	0.2	0.1
Janz	0.3	0.4	0.4	0.2	0.1	0.1
Correll <sup>Ⓛ</sup>	0.2	0.5	0.5	0.3	0.1	0.1
Kalannie	0.1	0.1	0.0	0.2	0.1	0.1
EGA 2248 <sup>Ⓛ</sup>	0.7	1.0	0.8	0.8	0.3	0.1
Blade	0.2	0.2	0.2	0.2	0.1	0.1
Endure <sup>Ⓛ</sup>		0.0	0.0	0.1	0.1	0.1
Wilgoyne	0.2	0.2	0.1	0.1	0.1	0.1
Eradu	0.2	0.1	0.1	0.1	0.1	0.1
Kunjin <sup>Ⓛ</sup>				0.0	0.1	0.1
Gladius <sup>Ⓛ</sup>	0.0	0.6	0.7	0.3	0.2	0.1
Cadoux	0.3	0.1	0.1	0.1	0.1	0.1

## Marketers

AGT, 09 9622 8935  
[www.ausgraintech.com](http://www.ausgraintech.com)

COGGO Seeds, 08 9310 2636  
[www.coggo.net.au](http://www.coggo.net.au)

InterGrain, 08 9419 8000  
[www.intergrain.com](http://www.intergrain.com)

Pacific Seeds, 07 4690 2666  
[www.pacificseeds.com.au](http://www.pacificseeds.com.au)

Seednet (formerly AWB Seeds), 08 8752 1777  
[www.seednet.com.au](http://www.seednet.com.au)

## Seed distributors

### Australian Seed and Grain

Moora, 08 9651 1069  
[www.austseedgrain.com.au](http://www.austseedgrain.com.au)

- AGT seed affiliate
- InterGrain seed group member
- Pacific Seed associate
- Seednet partner

### Coorow seeds

Coorow, 08 9952 1088  
[www.coorowseeds.com.au](http://www.coorowseeds.com.au)

- AGT seed affiliate
- Pacific Seed associate

### Eastern Districts Seed Cleaning Co

Kellerberrin, 08 9045 4036

- AGT seed affiliate
- InterGrain seed group member
- Pacific Seed associate
- Seednet partner

### Melchiorre Seeds

Narrogin, 08 9881 1155

- AGT seed affiliate
- InterGrain seed group member
- Pacific Seed associate

### MultiSEED Production

Esperance, 08 9071 1053

- AGT seed affiliate
- InterGrain seed group member
- Pacific Seed associate
- Seednet partner

# NVMT

National  
Variety  
Trials  
A GRDC INITIATIVE

## YOUR VARIETY FORM GUIDE

WE'VE DONE  
THE TRACK WORK  
FOR YOU



**GRDC** Grains Research & Development Corporation  
Your GRDC working with you

[www.nytonline.com.au](http://www.nytonline.com.au)

BELLATA 2397 COOLAH 2843 MERRIWA 2329 MULLALEY 2379 NORTH STAR 2408 SOMERTON 2340 SPRING RIDGE 2343 TAMWORTH 2340 WELLINGTON 2820  
WONGARBON 2831 BULLARAH 2400 COONAMBLE 2829 GILGANDRA 2827 GOONUMBLA 2870 NYNGAN 2825 PARKES 2870 TRANGIE 2823 TULLOONA 2400 WALGETT 2832  
ARIAH PARK 2665 BOOROWA 2586 BROCKLESBY 2642 CANOWINDRA 2804 COOTAMUNDRA 2590 COWRA 2794 CUDAL 2864 CUMNOCK 2867 GALONG 2585 GEROGERY 2642  
GRENFELL 2810 HARDEN 2587 HENTY 2658 QUANDIALLA 2721 TEMORA 2666 WAGGA WAGGA 2650 BALRANALD 2715 BECKOM 2665 BOREE CREEK 2652 COLEAMBALLY 2707  
CONDOBOLIN 2877 LOCKHART 2656 MAYRUNG 2710 MERRIWAGGA 2652 OAKLANDS 2646 WILLBRIGGIE 2680 BILOELA 4715 CAPELLA 4723 DUARINGA 4712 KILCUMMIN 4721  
SPRINGSURE 4722 BROOKSTEAD 4364 JONDARYAN 4401 KINGSTHORPE 4400 MACALISTER 4406 BUNGUNYA 4494 DULACCA 4425 LUNDAVRA 4390 MEANDARRA 4422  
MUNGINDI 2406 NINDIGULLY 4497 WESTMAR 4422 COCKALEECHIE 5631 CUMMINS 5631 GREENPATCH 5607 MT HOPE 5607 RUDALL 5642 UNGARRA 5607 WANILLA 5607  
WHARMINDA 5603 YEELANNA 5632 CRYSTAL BROOK 5523 LAURA 5480 MINTARO 5415 RIVERTON 5412 SALTERS SPRINGS 5401 SPALDING 5454 TARLEE 5411 TURRETFIELD 5411  
COOKE PLAINS 5261 GERANIUM 5301 LAMEROO 5302 NANGARI 5333 PALMER 5237 PARUNA 5311 PINNAROO 5304 WAIKERIE 5330 WANBI 5310 WUNKAR 5311  
BORDERTOWN 5268 CONMURRA 5272 FRANCES 5262 KEITH 5267 MOYHALL 5271 MUNDULLA 5270 SHERWOOD 5267 WOLSELEY 5269 DARKE PEAK 5642 ELLISTON 5670  
KIMBA 5641 LOCK 5633 MINNIPA 5654 MITCHELLVILLE 5602 NUNJIKOMPITA 5680 PENONG 5690 PIEDNIPPIE 5680 STREAKY BAY 5680 TOOLIGIE 5607 WARRAMBOO 5650  
ARTHURTON 5572 BRENTWOOD 5575 BUTE 5560 MAITLAND 5573 MINLATON 5575 PASKEVILLE 5552 PORT CLINTON 5570 URANIA 5573 WAROOKA 5577 WILLAMULKA 5554  
WOKURNA 5520 CRESSY 7302 BIRCHIP 3483 HOPETOON 3396 MANANGATANG 3546 MERRINEE 3496 MURRAYVILLE 3512 QUAMBATOOK 3540 RAINBOW 3424 ULTIMA 3544  
WALPEUP 3507 BALLIANG 3340 CHARLTON 3525 COLBINABBIN 3559 DIGGORA 3561 EASTVILLE 3463 MITIAMO 3573 DOOKIE 3646 RUTHERGLEN 3685 WUNGHNU 3635  
YARRAWONGA 3730 HAMILTON 3300 STREATHAM 3351 TEESDALE 3328 BRIM 3391 CORACK 3480 HORSHAM 3400 KANIVA 3419 MINYIP 3392 TARRANTYURK 3414  
WONWONDAH 3401 BADGINGARRA 6521 CARNAMAH 6517 ERADU 6532 MINGENEW 6522 MORAWA 6623 NABAWA 6532 OGILVIE 6535 WALKAWAY 6528 BADGINGARRA 6521  
BEVERLEY 6304 BINNU 6532 BUNTINE 6613 CALINGIRI 6569 COOROW 6515 CORRIGIN 6375 CUNDERDIN 6407 ENEABBA 6518 ERADU 6532 GOOMALLING 6460  
KATANNING 6317 KULIN 6365 MILING 6575 MINGENEW 6522 NAREMBEEN 6369 PINGELLY 6308 WAGIN 6315 WICKEPIN 6370 WONGAN HILLS 6603 WONGAN HILLS R.S. 6603  
ARTHUR RIVER 6315 COOROW 6515 FRANKLAND 6396 GNOWANGERUP 6335 KENDENUP 6323 KOJONUP 6395 MT. BARKER 6324 MULLEWA 6630 NARROGIN 6312  
NYABING 6341 PINGRUP 6343 TOODYAY 6566 WILLIAMS 6391 YORK 6302 ARTHUR RIVER 6315 BENCUBBIN 6477 CADOUX 6466 DALWALLINU 6609 KATANNING 6317  
KELLERBERRIN 6410 MERREDIN 6415 MOORINE ROCK 6425 MUKINBUDIN 6479 MULLEWA 6630 PINGELLY 6308 PITHARA 6608 WYALKATCHEM 6485 YUNA 6532  
GRASS PATCH 6446 HOLT ROCK 6355 HYDEN 6359 JERRAMUNGUP 6337 LAKE GRACE 6353 MT. MADDEN 6356 SALMON GUMS 6445 SCADDAN 6447 WITTENOOM HILLS 6447  
WONGAN HILLS 6603 ESPERANCE 6450 GIBSON 6448 MUNGLINUP 6450 NEWDEGATE 6355 HYDEN 6359 MERREDIN 6415 ESPERANCE 6450



# A FREE online tool predicting when wheat varieties flower

## Flower Power



- Provides support for decisions on variety choice and sowing
- Maximising yield potential
- Better management of frost and heat stress risks



[agric.wa.gov.au/frost/flower-power](http://agric.wa.gov.au/frost/flower-power)



